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ABSTRACT

This document describes the goals, objectives and actions taken to update the Santa Monica College (CA) Master Plan for Technology as administered under the District Technology Committee. A number of principles were agreed upon as the basis for development between 1998 and 2000. Among those principles included were: technical training and development for both faculty and staff, a replacement schedule for outdated equipment, a personnel plan, and support for faculty who wanted to increase the use of technology in their classrooms. Specific personnel needs are addressed as well as information on streamlining the purchasing cycle. Specific objectives and summary spreadsheets are included for 1998-1999 and 1999-2000. Appendix A provides a review of the TTIP Human Resources Technology and Training program. Appendix B provides a sample grant application. Appendix C includes information on staffing issues, with bibliographies and articles. Appendix D contains an overview of industry training. Appendix E discusses the multimedia production flowchart. Appendix F provides copies of completed forms used by Solano County (CA) for equipment repair and replacement procedures. Appendix G outlines the plan for assertive technology. Appendix H describes support for the multimedia center. Also included are references and a training proposal for faculty and staff. Overall this report contains a comprehensive outline for technology development with attention given to all aspects of the institution. (AF)

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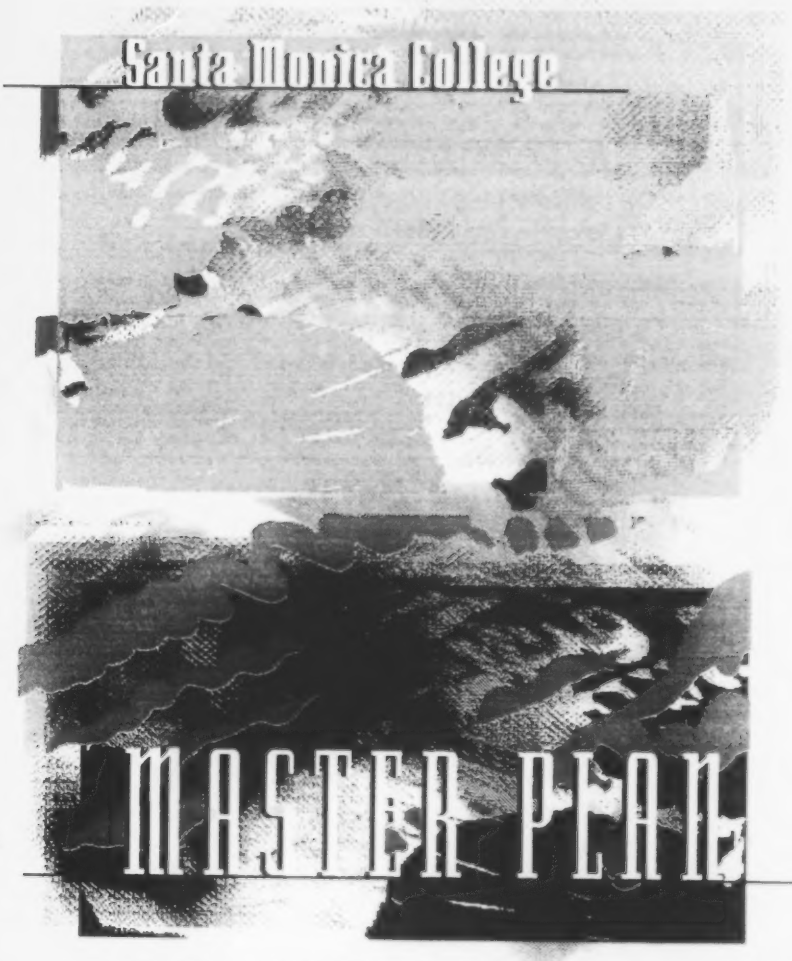

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SANTA MONICA COLLEGE

Master Plan for Technology, Revision 1998 - 2000

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PURPOSE OF THE DISTRICT TECHNOLOGY COMMITTEE

The purpose of the Santa Monica College District Technology Committee is to develop, revise, and insure implementation of the Technology Master Plan. Because of the Committee's oversight responsibility for the Technology Master Plan, it acts as a subcommittee of the Collegewide Coordinating Council and the liaisons maintain communication with both Senates.

REVISED MASTER PLAN FOR TECHNOLOGY 1998-2000

INTRODUCTION

A District Technology Committee charged with rewriting Years 3 and 4 of the Master Plan for Technology was formed as a subcommittee of the Coordinating Council in March of 1998. The Technology Committee consists of the following members: The Vice President of Planning and Development (chair), the Director of Information Resource Management, the Director of Academic Computing, the Coordinator of Technology Training and Research, the President of the Academic Senate, the President of the Classified Senate, the Chair of the Information Services Committee, the Associate Dean for Distance Education, an Academic Senate appointee and two Classified Senate appointees.

The original *Master Plan for Technology 1996 - 2000* was researched and written two years previously; with the rapid pace of change in this area, new technologies and requirements have emerged at the College and in the world at large. The Technology Committee has reviewed the stated objectives in the original plan and made revisions where appropriate. **This document is an update to the original *Master Plan for Technology 1996 - 2000* and should be inserted into the update loose-leaf binder in Section 4.**

The Revised Plan for Years 3 and 4 will be reviewed by the constituents of the College, including the Information Services Committee, the Academic Senate, and the Classified Senate and the College-wide Coordinating Council. The approved document will be submitted as the recommendation to the President of the College.

The Technology Committee began the process of formulating objectives for Year 3 by reviewing the Master Plan's first two years' objectives. Those that remain unfulfilled or only partially implemented are:

- An integrated administrative software system including Human Resources, Student Services, and Financials;
- Campus-wide access to the Library catalog;
- A fully developed Distance Education Plan that would interface with the Master Plan for Technology;
- Integration of state of the art technology into the curriculum;
- Training;
- Implementing better security.

While progress has been made in most of these areas, they are not yet fully implemented and not available to the College as a whole.

It was agreed that these objectives would be addressed immediately in Year 3.

GUIDING PRINCIPLES

The committee agreed upon the following principles as being the basis of the development of Year 3 objectives:

- **Non instructional (i.e. student services and academic affairs) training will be handled through implementation of the PeopleSoft human resources, financials, and student administration systems**. It is expected that extensive training will be provided in each of these areas to end users.
- Academic Department technology liaisons will be appointed from the full time faculty and awarded a stipend to be determined in consultation with the collective bargaining agent. The job description for the technology liaison is to promote use of educational technology in instruction and includes the following duties:

Academic Department Technology Liaison
Job Description

1. Serve as communication link between department and Director of Academic Computing and Coordinator on Technology Training and Research.
2. Direct department faculty to appropriate resource for technology questions.
3. Assist department faculty with technology questions, as able.
4. Attend quarterly meetings with Director of Academic Computing and/or Coordinator on Technology Training and Research for information updates and technology issues discussion.
5. Work as coordinator for development/update of department technology plan.
6. Monitor development of departmental WEB pages.
7. Attend the SMC four part training workshops.
8. Attend a workshop on assistive technology and access to the Web.

- The revised Plan must include a replacement schedule for out-dated equipment including a plan for re-deployment or retirement for this year and ensuing years. Most districts have yet to develop such a plan (see Appendix F: Solano County CC District Survey), but with the recent infusion of technology dollars, this issue is becoming increasingly important.
- A fully developed staffing plan will be developed that includes guidelines based upon research studies on the number and type of staff required to support each distinct addition of technology (number of Telecom techs per number of PCs, type of staff support for each new instructional lab, etc.). The plan will follow these guidelines by being specific in detailing the specific job classifications and number of individuals. *Staffing will be a priority issue to ensure that equipment is fully utilized and implemented once it is purchased.*
- Departments who have evidenced an interest in integrating technology into teaching in their Technology Plans were identified and appropriate technology will be made available to them to ease the burden of transporting the technology from the Media Center. (See Objective 4, 1998 – 1999).

- Release time guidelines will be developed to enable departments to implement the technology they receive.
- A basic training program (based upon the Berkley CALPACT model) will be developed and no new equipment deployed until the recipient has taken the training. Administration will mandate training and release time for those receiving new equipment. Telecom will not install new PCs until the recipient has taken this training. The College now purchases IBM PCs through the Vanstar California Community College program; new orders will be shipped within three weeks of the issuance of the purchase order. Faculty/staff can opt for training in the month of ordering or wait for the next month's cycle.
- Workshops on writing technology plans will be offered and an instructional component will be added to illustrate the implementation implications of the plan.
- All new PCs will include Zip drives and employees will be given instruction on their use during the training sessions mentioned above.
- The Faculty/Staff lab will be in close proximity to the Media Center to facilitate the objective of collaboration between the two units.
- Improved communication on lines of responsibility in training and technology support will be shared with the College community.
- The College firmly believes in expanding access to technology so that faculty and staff can start to realize the potential of information technology. To that end, the College encourages faculty, staff and students to participate in the system-wide purchasing program instituted by the Chancellor's Office. Please visit the vendor's website at **www.vanstargov.com/ca** to find out the details about participating in this program (such as ordering using a credit card). The College, however, will continue to look for the best possible combination of price and service in its District-assisted laptop purchase program for faculty and staff, in which the District will contribute partially towards the purchase of a laptop computer for eligible faculty and staff.

TECHNOLOGY MASTER PLAN SOURCES OF FUNDS

The technology needs of the college are immense. Unfortunately, the infusion and currency of the technology is controlled by the level of available resources. In the last two academic years, the college has invested more money into technology than anytime in its history. The sources of funds for these acquisitions are varied and unpredictable.

One of the primary sources of funds, that is now the most reliable, is the instructional equipment grant from the State of California. Now that instructional equipment funds have been incorporated into our base revenue, the college can anticipate approximately $750,000 plus a required district match of $250,000 for a total of $1 million each year. However, these can only be used for instruction and cannot be used exclusively for technology because they must also pay for regular instructional equipment (e.g. microscopes, pianos, and easels). The second major source of funds from the State of California is block grant funds. These are one-time only funds that are distributed as part of annual Proposition 98 reconciliations. While they have been bountiful the last two years, they are very unpredictable. Furthermore, most people believe they will be smaller over the next two years from what they have been during the last two years (over $1 million each year). The third source of funds from the State of California is the Telecommunications Grant. While it is clearly the smallest of the three sources, in the current year it is providing funds for the library technology and technology training components of the Technology Master Plan.

Besides state funds, there are also three sources of local funds used to pay for the Technology Master Plan. The first source of funds comes from the Associated Students Card sales. While a portion of the funds are used by the district to fund technology for students and related student services in the Technology Master Plan, the remainder of the funds are controlled by the Associated Students Board on a project basis. While they hopefully spend in accordance with the Technology Master Plan, the allocation is at their discretion. The second local source of funds is unrestricted general funds. Clearly the first level of contribution from these funds is to make the necessary district match (e.g. instructional equipment). However, in lean years, these general funds have become the primary source of funds. Each year this is a budget decision based on college revenues, alternative technology sources of revenues and competing uses for general funds. The third source of local funds is contributions (both money and equipment). The Academy has clearly been the most successful area to engender this type of support.

The final source of funds for technology is grant monies. The college has been successful in selected areas. This year the college received $1.25 million in a state grant for the Academy. VATEA funds have also helped every year to pay for small acquisitions and occasionally a large purchase (e.g. VERC lab). The difficulty with grants is they are unpredictable and many specifically prohibit the use of funds for equipment.

The uncertainties of these funding sources make it difficult to write a meaningful Technology Master Plan. It is unlikely that there will be more than $2.5 million available in any given year except when the college also receives a single purpose grant. Therefore, the plan needs to be prepared to adjust each year to the level of available funds. Part of the reason the technology has been so well funded during these last two years is that the administration and the Academic Senate made it a district priority. That commitment needs to remain in place if the college hopes to implement the needed changes in technology.

PEOPLESOFT SYSTEM

(More information about the PeopleSoft software is found in Appendix E of this document.)

The implementation of the integrated Human Resource, Financial, and Student system will be a major undertaking during this and the proceeding fiscal year. The District will work with its implementation partner to map out a successful strategy for full implementation within 24-36 months. While the details of this strategy are not known at the time of publication of this Revision, certain broad requirements are already evident.

- The first requirement is to reach full staffing in the Information Management department, which is currently operating at less than half staff for mere maintenance of the current system.
- A Project Manager will lead the implementation for the District. This person will need not only excellent technical skills, but more importantly, excellent communication, team building, project management, motivation, and consensus building skills. He/she should have successfully implemented large scale software projects and should have a proven track record in these areas of responsibility.
- New positions will need to be created or professional experts recruited to ramp up to the required staffing for implementation of a new system while maintaining the current system.
- Physical facilities and equipment will be required to house the implementation team, including the technical staff and the user staff.
- Departments will need to designate and grant a certain percentage of release time to key user employees during certain periods of the implementation cycle during the next two years. These employees will need to be adequately trained and will need expert and detailed knowledge of the business processes in their areas of expertise. Lead users will also need to be designated in each area.
- International Students operates as a "mini-college within the College" and will provide an excellent beta test site for many of the modules of PeopleSoft. Since they operate, in many ways, in a similar manner to a private institution, they are also the best fit to the uncustomized PeopleSoft system thus allowing early implementation.
- Departments will have to assume "ownership" of their data and stop relying on Information Management to provide answers to business processes. New ways of operating must be initiated by the departments, and the owners must assume responsibility for **documentation** of procedures. The department must also assume responsibility for the accuracy of data.
- Students and faculty will also assume ownership of certain data. A paradigm shift from data entry to self-service will gradually occur during the implementation process.
- Departments will need to review and identify the scope of the modules that they wish to implement as soon as possible, including identifying the possibility of enhancements such as imaging and Web enabled interfaces.

PERSONNEL NEEDS

Appropriate Levels of Staffing

The Committee feels it necessary to establish explicit guidelines on staffing levels based upon levels in industry and comparably sized institutions of higher education based upon factors such as the number of nodes to be supported, and the number of users.

The Committee has therefore researched data available from institutions of higher education through CAUSE's annual institutional survey, and through Gartner group studies of industry staffing averages. The findings of these studies are found in Appendix C: Information Systems Staffing Issues.

The first spreadsheet in Appendix C is an extract of the CAUSE survey showing a comparison of levels of staffing in the three branches of computing at institutions with comparable FTES to Santa Monica College. It clearly shows that SMC is operating at less than half staff overall, and is at a particularly low level in administrative and telecommunications support.

The second attachment shows the average FTES to support staff level for all 327 colleges and universities in the survey, as well as a breakout of those within our FTES range. Once again, we are at half the number of support staff to FTES for colleges in our FTES range.

The third attachment is a reprint of an article by the Vice President of the Network Computing Service at Gartner Group, Inc., David Cappuccio, discussing optimal workstation nodes to support staff ratios. He divides users into three groups and levels vary in the groups from 1:30 for the high end users, to 1:60 or 1:100 for medium end users, to 1:125 for occasional users.

Assuming that Santa Monica College stayed at the middle level of support, each 100 new nodes on campus would require:

- An additional Telecom tech I
- An additional Network Analyst.

Every 200 new nodes would require:

- An additional Telecom tech II

In addition, every new instructional lab requires:

- An instructional Lab Assistant.

Recruiting and Retaining Personnel

Apart from the setting appropriate levels of staffing in the technology arena, the District must deal with the problem of recruiting and retaining skilled information systems personnel. There is a large national deficit of trained professionals in this area, as well as a very competitive local market. A department of Commerce white paper, "America's New Deficit: The Shortage of Information Technology Workers," is included in Appendix C. This paper gives statistical evidence of the shortage and suggest ways in which it can be addressed. It also includes "examples of partnershiips between industry, government, and educational institutions ... with the hope of encouraging improved interactions among concerned groups."

Even if potential candidates can be located, without a quick turn-around in the hiring process, these candidates quickly find other opportunities and drop out of the hiring process before they can be interviewed. A very streamlined process must therefore be used to hire employees in this area.

After employees are hired, they often receive extensive training to learn the specific systems and software in use at the College. While the District is committed to providing necessary training to employees, our advances into leading edge technologies make these newly trained employees very marketable and they are increasingly being recruited by outside entities.

Therefore, the Technology Committee recommends the following measures be undertaken to ensure information systems workers are retained:

1. All positions under Information Resource Management should be examined immediately for possible reallocation of salaries.
2. The Directors of Telecommunications, Information Management, and Academic Computing will examine their areas to ensure that each employee has a clear cut career ladder. Where such pathways do not exist, steps will be taken to create appropriate opportunities for career advancement.
3. Santa Monica College will investigate new curriculum areas such as those outlined in Appendix D: Industry Training Initiatives not only to provide entry level personnel for the College but more importantly, to address the shortage of information workers across the nation.
4. Recruitment efforts will focus on the opportunities at the College to participate in advanced state of the art technology endeavors such as our ATM network backbone, the PeopleSoft implementation, client/server applications, Web development efforts, distance education endeavors and the Academy of Entertainment.

STREAMLINING THE PURCHASING CYCLE

In order to ensure that newly acquired technology is not rendered obsolete even before implemented, it is critical that a streamlining of the purchasing process take place. **Recommendations will be made by the newly hired Technology Project Manager** concerning the ways in which this process can address the following needs:

- Currency of technology specifications and information dissemination to the college community regarding these specifications
- Tracking of blue equipment sheets
- The timely transmittal of blue sheets to Purchasing
- Having current bids in place before blue sheets arrive in order to expedite ordering
- Purchasing from vendors without backlogs of orders to ensure timely delivery
- Tracking of purchase orders and invoices to reconcile budgets
- Notification of delivery to proper entities to ensure quick installation
- Working with vendors to obtain the best prices and donations or grants where appropriate
- Proper "sizing" of equipment to the scope of the project or needs of the end user
- Integration of all technology purchased into existing systems.

YEAR 3 OBJECTIVES

1998 - 1999

SPECIFIC OBJECTIVES 1998 - 1999

Objective 1:

Implement the PeopleSoft integrated Student, Human Resources, and Financial systems in a timely manner. The District purchased the PeopleSoft system in March of 1998 and will begin to implement it immediately. More information on the PeopleSoft is found in Appendix E of this document.

Tasks: 1.1: Form implementation oversight team
1.2: Order development platform hardware
1.3: Design implementation strategy
1.4: Form user implementation teams
1.5: Obtain appropriate physical facilities for implementation planning
1.6: Evaluate and implement release time needs for departments
1.7: Train oversight team in high level technical areas
1.8: Begin implementation
1.9: Train other team members

Cost: **$412,405** (allocated in original Plan; real cost to be determined)

Timeline: Begin May of 1998; implementation target 18-36 months dependent on the number of modules implemented.

International Students may act as a beta test site for much of the software as it functions as a "college within a college" and has little current automation. The size and scope of its operations and the existing manual processing system make it a good candidate for early implementation tests.

Objective 2:

Make the Library catalog available from any workstation on campus and at remote sites. While this objective requires no funding, it is contingent upon the hiring of a Systems Librarian in the Library.

Tasks: 2.1: Implement new OPAC (SIRSI) in Library
2.2: Hire Systems Librarian
2.3: Develop deployment strategy for all networked nodes

Budget: $0

Timeline: Dependent on Library hiring.

Objective 3:

Extend the Virtual Office Hours (VOH) project to new areas of campus including Counseling and academic departments with low participation, and modify the existing VOH software to improve administrative features for handling the large number of users anticipated. The Coordinator of Technology Training and Research will assume responsibility for VOH. The Internet Specialist will assist the Coordinator in hiring a programmer to make the necessary modifications to the

software and will assist the VOH programmer in becoming acquainted with the existing VOH software and desired improvements.

Tasks: 3.1: Hire a VOH programmer to work approximately 150 hours.
3.2: Develop training materials for faculty.
3.3: Train the Computer Education Specialist to hold regular VOH training workshops for faculty.
3.4: Study usage trends and perform outreach to underserved departments.

Budget: $5,000 for PC and materials.

Timeline: Begin early July; have workshops ready for Fall 1998 semester.

Objective 4: (Year 2 of 3)

Continue to encourage integration of state of the art technology with instruction. Specifics of the plan include: a spring semester technology fair or separate flex day activities with each department that encourage research into new technologies for instruction in each area. Install permanent multimedia equipment in a classroom in departments where there is already multimedia courseware in use (**Social Science, Music Auditorium, and Technology Building**). Identify and assign a departmental technology liaison responsible for working with the department to integrate technology into the curriculum.

Tasks: 4.1:Organize technology fair in Spring of 1999 (spring is preferable to fall as it is hard to obtain enough vendors because of the demand at the opening of the academic year.)
4.2:Identify department technology liaisons and hold quarterly meetings to discuss common issues and strategies.
4.3: Organize discussion group on Intranet server.
4.4: Work with departments to plan for Flex Day activities.
4.5: Order equipment; mobile carts and fixed video projectors.

Budget:	Technology Building mobile cart:	$13,000
	Social Sciences classroom system:	
	(installed in LV 9	$ 8,000
	Music Auditorium high end projector:	$15,000

	TOTAL	**$36,000**

Timeline: Begin July of 1998. Technology Fair should be in Spring 1999.

Objective 5: (Year 1 of 2)

Develop a replacement policy and schedule for outdated technology. Replace a specified number of outdated workstations and re-deploy or retire the replaced equipment.

Of the current equipment on campus (excluding student labs), **74 PCs or Macs are totally obsolete**. (They fall into the 286 generation of CPUs and are inadequate to even run Windows 3.x.). Another **83 PCs and Macs are in the 386 generation** of computers and are, for most purposes, obsolete, although a small number may still suffice for dedicated applications or terminal like use.

Thus, there are at least **157 computers** on campus which have greatly outlasted their usefulness. It becomes impractical to upgrade software or deploy new applications when a large portion of the campus community can not participate in their use.

Tasks: 5.1: Develop written policy statement regarding obsolescence and build it into budget.
5.2: Decide on number of workstations to replace this fiscal year.
5.3: Order equipment.

Budget: To replace the 74 most obsolete nodes (at $2,500 per node) would cost: **$185,000**
(To replace the other 83 obsolete nodes (same assumed price) would cost:
$207,500 – therefore deferred to Year 4)

TOTAL	**$185,000**

Timeline: Begin July 1998.

Objective 6:

Equip the new Science building with a computer lab. Room 240 has been designed as a computer lab in the new building. There are also a total of 30 faculty offices that are wired for computers. There is also a workroom designated for part time faculty.

Budget: 30 node computer lab in Room 240:	$120,000	
30 Faculty computers:	$ 90.000	
10 computers for adjunct faculty:	$ 30,000	
14 Laptop computer & docking	$ 70,000	
TOTAL	**$310,000**	**(From State Funds)**
TECHNOLOGY PLAN TOTAL:	**$0**	

Timeline: Dependent on construction.

Objective 7:

Standardize the Faculty/Staff lab so that all (or almost all) software can run on all workstations so those users do not need to sit at specific workstations. The Faculty/Staff lab will become the main mentoring area for development of courseware and multimedia presentations. Equipment will be networked, easily accessible and standardized.

Budget:	15 PCs capable of high end graphics and multimedia:	$45,000
	Networking:	$ 6,000
	TOTAL	**$51,000**

Timeline: Begin July 1st, have ready for opening of Fall semester.

Objective 8:

Develop a plan for training of both classified and instructional employees.

The TTIP grant from the Chancellor's office will fund Santa Monica College with a total award of $58,952.02 from the "Technology Human Resources Fund." Of that amount, the total of faculty allocation is $33,302.40 and staff allocation of $17,159.06 and the base allocation is $8,490.57.

The Expenditure plan for this allocation was approved by the Board in April of 1998 and submitted to the Chancellor's Office. (See attached TTIP Technology Training Expenditure Plan for 1997-98 in the Appendix to this document.)

Training will follow the details submitted in these plans.

The Coordinator of Technology Training and Research will submit a detailed survey and recommended plan by the end of the 1998 calendar year. Implementation of this plan will follow at the start of the 1999 calendar year.

Tasks: 8.1: Develop TTIP certification expenditure plan and submit to Board in April of 1998. (Done)
8.2: Work with Professional Development Committee to integrate technology training with other training.
8.3:Implement Technology Training Plan as soon as possible.

Budget: **$0 (from Technology Plan)**
$58,952.02 (from TTIP grant)

Timeline: In progress

Objective 9:

Partially fund four new labs at the Academy. Private donations will fund 3/4 of the labs. Each new lab requires the addition of 15 new PCs in the open lab.

Budget: 1 server, 15 workstations in open lab, 25 workstations in instructional lab, software, network devices: **$250,000**

Objective 10:

Establish a centralized Help Desk (one stop problem reporting). The Coordinator of Technology Training and Research will make a recommendation on the best way to organize all end user help functions at the College.

In 1997-98 the Help Desk was contracted out to VSS with little success. They were unable to answer the most basic questions on common application software such as Word, let alone successfully solve remote access problems or email difficulties. The College paid on a per incident basis, but VSS provided almost no help to users. It is vital to provide better service to the campus community and to stop using highly paid technicians and programmers to answer phones and provide individual tutoring.

Budget: **$68,000**

Tasks: 10.1: Hire Microcomputer Specialist (in progress)

10.2: Purchase help desk software and hardware
10.3: Train Microcomputer Specialist in help desk software
10.4: Begin weekday help desk support for all faculty and staff in fall of 1998 and for students in Winter 1999.
10.5: Expand help desk support to evening and weekend hours.
10.6: Coordinator of Technology Training and Research will make a recommendation on the best organization for end user support issues at the College.

Objective 11:

Continue District supported computer purchase program. In the 1997-1998 academic year, the District began a program to help full time and adjunct faculty and full time classified employees lease/purchase notebook computers.

Budget: **$60,000**

Objective 12:

Have the majority of students (new and returning) register by telephone. The new EPOS IVR (interactive voice response) system should be extended to first time students by means of a telephone bank after they complete assessment, advisement and orientation. This would alleviate some of the overcrowding in the Registrar's office and will familiarize the students with telephone registration from their first semester. Also, by using a supervised telephone bank, students can get their questions answered and become proficient.

Tasks:

Budget: $0

Timeline: Implement in Fall of 1998

Objective 13:

Ensure that Music, Art, Theatre and Liberal Arts buildings have adequate network wiring. Since the Liberal Arts building will be eventually replaced, investments in wiring should be well thought out and carefully planned. To run fiber to the Theatre would cost $30,000 in trenching as the present trenches have collapsed. An alternative is to use a Pairgain device, such as is in use in ESL to connect Theatre to the rest of the campus.

Budget: **$20,000**

Objective 14:

Offer workshops on developing technology plans. Instructional and Student Services departments need assistance in developing area specific technology plans to submit to the Information Services Committee for funding. The workshops should be held in early spring before the solicitation of plans by the Committee.

Budget: **$1,000** for materials.

Objective 15:

Designate a sum of money for the Information Services Committee to fund new labs and mini-labs. Include solicitation of plans from Student Services areas. Also include campus-wide fund for technologies that benefit entire instructional program. Priority in labs will be given to Modern Languages and Music as discussed by last year's Information Services Committee. In Year 2 of the Master Plan, the ISC received $850,000

Budget: **$850,000**

Objective 16:

Support Distance Education plan by purchasing and installing specified software and hardware when such software and hardware must integrate with the campus network.

The Governor is proposing regional centers for training faculty from all three higher education public sectors in California in the development of "virtual courses" for the new California Virtual University. Santa Monica College should consider either sponsoring such a center or teaming up with a local institution to participate in this training. Integrated software package such as Convene will be used to support file transfer, meetings, mail, assignment exchange, discussion.

Budget: **$25,000 (for server)**

Objective 17:

Continue to secure the network. Add additional firewalls to secure internal resources. Currently, we have only one firewall. We need one for each of the three VLANs, as well as our main Sun server.

Budget: **$30,000**

Objective 18:

Network Madison campus.

Budget: **$15,000**

Objective 19:

Include Assistive Technology plan into overall Master Plan and make mandatory when funding any new labs.

Tasks: 19.1: Include Plan in Appendix G of this document

19.2: Put specifications for Assistive technology workstations on Web along with current workstation specifications.
19.3:Purchase needed software for labs.

Budget: $10,000

Objective 20:

Equip the Media Center with necessary video equipment to support cable TV production and broadcast. *(See Appendix I for more details on the vision for the Media Center and Faculty/Staff multimedia lab.)*

Budget: $75,000

Objective 21:

Year 3 of 4 - Continue to facilitate the integration of the Faculty/Staff lab and the Media Center. A higher end video editing system (AVID) will be required, as well as DVD recording and replication capabilities, and multimedia software licenses.

Budget: $60,000

Objective 22:

Upgrade the Audix voicemail system to support text to speech email conversion (so that email can be retrieved from a telephone anywhere), as well as network fax capabilities allowing users to send or receive faxes from their PCs. This will eliminate the need for multiple fax machines and costly fax lines.

Budget: $40,000

Objective 23:

Replace and upgrade existing servers that are outdated or no longer sufficient for their tasks. This includes print servers, file and email servers.

Budget: $65,000

Objective 24:

Upgrade the network infrastructure. Additional network equipment to support growth on campus including hubs and switches is required to add new nodes. Also, the ATM switch has maxed out its port usage and an additional switch will be needed. A network "sniffer" is also needed to help diagnose network outages and monitor bandwidth utilization. At present, outside consultants

must be brought in with this equipment; apart from the cost of their services, there the College experiences significant delays in fixing network problems.

Budget: Hubs: $65,656
Sniffer: $22,000

TOTAL $87,656

Objective 25:

Begin ORACLE, Cisco Networking Academies, and/or MicroSoft certification training and education as part of the Business curriculum, or through Community Services or Contract Education (as appropriate.) Not only are ORACLE programmers in short supply, starting salaries for those who are trained in this software are excellent. This could also provide a source of programmers to the College.

Timeline: ORACLE courses are going to the curriculum committee for Fall classes. **Other opportunities will be coordinated by the Director of Academic Computing.**

Budget: **$500**

Objective 26:

Apply for Chancellor's Office grant to open a Virtual courseware training center where faculty from the College and partnering districts can be mentored in developing online and distance education courses. The governor has allocated over $3 million to community colleges to establish such centers to provide courses for the California Virtual University.

Budget: **$0 (from Technology Plan)**

Objective 27:

Implement system to monitor and control printing in instructional and open labs. Without such a system, the consumption of paper and laser cartridges will soon be prohibitively expensive.

Budget: **$10,000**

Objective 28:

Purchase software system to administer, deliver, and manage distance education offerings. An integrated software system that delivers all the functionality required to offer full Internet based classes will be procured. The software will also allow administrators to monitor and control the enrollment and progress of students taking such online courses.

Budget: **$25,000 (from distance education funds)**

	Summary Spreadsheet of Proposed Technology Objectives	
	Year 3: 1998 - 1999	

Obj. Number	Summary	Budget
Objective 1	*Obtain and implement an integrated administrative system*	$412,405
Objective 2	*Make Library catalog accessible on campus and remotes*	$0
Objective 3	*Extend Virtual Office Hours*	$5,000
Objective 4	*Encourage integration of technology into curriculum*	$36,000
Objective 5	*Replace outdated PCs and Macintoshes*	$185,000
Objective 6	*Equip new Science building with lab and faculty PCs*	$0
Objective 7	*Upgrade Faculty/Staff lab for multimedia*	$51,000
Objective 8	*Develop training plan*	$0
Objective 9	*Partially fund new labs at the Academy*	$250,000
Objective 10	*Bring help desk in house*	$68,000
Objective 11	*Continue District support of lease/purchase notebooks*	$60,000
Objective 12	*Have students register by telephone*	$0
Objective 13	*Connectivity for all campus buildings*	$20,000
Objective 14	*Offer workshops on developing technology plans*	$1,000
Objective 15	*Fund labs and mini-labs through ISC*	$850,000
Objective 16	*Support distance education*	$25,000
Objective 17	*Continue to secure the network*	$30,000
Objective 18	*Network the Madison campus*	$15,000
Objective 19	*Include Assistive Technology Plan in new labs*	$10,000
Objective 20	*Equip Media Center with video equipment for production*	$75,000
Objective 21	*Continue to integrate Media Center with Fac/Staff Lab*	$60,000
Objective 22	*Upgrade Audix for email and fax capability*	$40,000
Objective 23	*Replace outdated servers*	$65,000
Objective 24	*Upgrade network*	$87,656
Objective 25	*Develop ORACLE training and integrate into curriculum*	$500
Objective 26	*Apply for Chacellor's Office grant-- virtual training center*	$0
Objective 27	*Monitor and control printing in instructional labs*	$10,000
Objective 28	*Software for distance education*	$0
	TOTAL	**$2,356,561**

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SPECIFIC PERSONNEL NEEDS 1998-1999

These are staffing requirements independent of the PeopleSoft implementation. The PeopleSoft implementation will necessitate faculty, administrative and classified reassign time, as well as a Project Leader and additional contract personnel.

Academic Computing

- Academic Department technology liaisons will be appointed and awarded a stipend to be determined in consultation with the collective bargaining agent. The job description for the technology liaison is to promote use of educational technology in instruction and includes the following duties:

Academic Department Technology Liaison
Job Description

1. Serve as communication link between department and Director of Academic Computing and Coordinator on Technology Training and Research.
2. Direct department faculty to appropriate resource for technology questions.
3. Assist department faculty with technology questions, as able.
4. Attend quarterly meetings with Director of Academic Computing and/or Coordinator on Technology Training and Research for information updates and technology issues discussion.
5. Work as coordinator for development/update of department technology plan.
6. Monitor development of departmental WEB pages.
7. Attend the SMC four part training workshops.
8. Attend a workshop on assistive technology and access to the Web.

- **Academic Computing Specialist** - Offer computer hardware and software support in the operation of mini-labs and other Academic Computing projects; assist in researching and deployment of Academic Computing equipment; act as the liaison to other campus computing entities such as telecom and Network Services.

Information Management

- 1 **Network Analyst** - support for email and end user questions concerning ISIS
- 1 **Systems Analyst** - implementation of the new integrated software system will require strong IS professionals skilled in analyzing and mapping business functions and workflow to the database and user interfaces.
- 1 **Quality Control Analyst** (new classification) - coordinates changes in programming with testing, debugging and production
- 1 **Programmer Analyst II** - support for PeopleSoft Implementation

- 1 **Senior Programmer Analyst** (new classification) - supervises all database programming

Telecommunications

- 1 **Network Systems Manager** - oversees operations of Telecommunications on day to day basis; configures high end equipment such as the router, firewall, and network management software; ensures service levels are consistent and timely, supervises all Telecommunications personnel

Media Center

- 1 **Video Technician** - (new classification) - Responsible for college video production and distribution including cable TV operations, satellite downlinks, and production of college telecourses, special events and promotional materials. Schedules programming for cable channel. Assists faculty and staff in preparing and producing program material. Operates and maintains video equipment as used in production, cable broadcast.

Information Resource Management

- 1 **Computer Operations Specialist** - (new classification) - provides administrative support to all four Directors in the area; is the back up help desk person if the primary person is busy or away; helps users configure requisitions and blue sheets correctly; schedules and coordinates vacations and training dates to ensure adequate staffing; researches new technologies and arranges demonstrations from vendors; answers surveys and requests for information from other institutions.

YEAR 4 OBJECTIVES

1999 - 2000

INTRODUCTION

This last year of the Technology Master Plan follows the guidelines established in the original *Master Plan for Technology*, as well as those enumerated in the revision of Year 3.

The hope for the final year is to bring to fruition the investments and innovations made in the previous three years. For instance, the new PeopleSoft system will finally allow self-service by students in areas such as Web based application to SMC, Web class registration, Web grade inquiry, change of address, etc. The faculty will also benefit from self-service by viewing through the network information about their classes and students that must currently be obtained through clerks in the Registrar's office. Reporting will not longer be centralized through Information Management, allowing real time inquiries, what-if projections, and summary information which may be obtained by authorized and appropriately trained users.

At the same time, such an integrated system will entail massive changes in the business processes of the College, and in the routines of those who interact in any role with the College. The College must be prepared to better document, diagram and analyze the flow of information throughout the system, and must better prepare its constituents to think in systems, rather than isolated terms. For instance, certain data may be collected in offices that will not ultimately be the users of that data element. The data will then flow downstream as the person or entity progresses throughout the system, and the importance of its initial accuracy can be greatly exaggerated in later interactions. (Just as a deviation of a fraction of a degree will be magnified, in time, resulting in gross miscalculations.)

The investments made in training facilities and training opportunities should result in greater integration of technology in teaching and learning, and in increased opportunities for classified employees to automate routine chores, thus resulting in more personalized interaction with students.

At the same time, it is recognized that technology will always remain a moving target, and there will be no attainment of a summit, nor plateau, nor opportunity for complacency. One example, especially, illustrates this point: in this final year, 1999, the College will replace the last of its 386 computers -- computers which are now, two years previous to the planned replacement, already obsolete.

The planning cycle is a self-renewing process for dealing with the chaotic changes in technologies and expectations. With the completion of this *Master Plan for Technology 1996 - 2000*, the first objective of Year 4, will obviously be the development of a new Plan, based upon realities and guiding principles that are barely discernable from this vantage point but which must be evaluated and researched by those who will create the new Plan.

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SPECIFIC OBJECTIVES 1999-2000

Objective 1:

The District Technology Committee will designate entities to contribute to researching, surveying, formulating and publishing a new Master Plan for Technology. Assessment of the impact and fulfillment of the existing Plan will be included, with recommendations for continuous improvement.

Cost: $0

Timeline: Beginning of Fall 1999 semester

Objective 2: (Year 2 of 2)

One of the guidelines stated in Year 3 of the Revised Technology Plan was scheduled renewal of obsolete technology. In this fiscal year, over 300 administrative network nodes will be obsolete, in part due to a large investment made in fiscal year 1994-1995. However, next year, there are an additional 160 instructional 486s that will need replacement, and a certain percentage of the early Pentium PCs (100-megahertz machines) will also become obsolete. The Committee has struggled with the question of how to balance the cost of replacement technology with costs for new technology. In Appendix F, a survey from Solano CC is found which shows that only one of seventeen responding community colleges has an existing replacement policy. The infusion of technology monies from the State beginning in fiscal year 1996-97 will force districts to increasingly wrestle with achieving a balanced policy regarding this issue.

Continue replacement of outdated PCs and Macs. In the previous fiscal year, the 286 machines were replaced. The 386 and 486 (or equivalent Macs) and Xterminals will be replaced during this year. There are eighty-three 386 PCs or Macs, one hundred fifty-two 486 PCs or Macs, and 100 Xterminals. **Replacement of this equipment is mandatory for the new PeopleSoft system implementation.**

Tasks: 2.1: Verify survey and assess the use of each machine (some may be useful for limited scope use such as modem connections)
2.2: Order equipment
2.3 Develop replacement plan and deploy

Budget:	83 386 or equivalent PCs @ $2,500 per node:	$207,500
	152 486 or equivalent PCs @ $2,500 per node:	$380,000
	100 Xterminals @ $2,500 per node:	$250,000
	TOTAL	**$837,500**

Timeline: Begin July 1999

Objective 3:

Replace the telephone system at the Airport campus (assuming lease is renewed).

A small Merlin system can be put at the Airport to update the antiquated system currently in place; this system will tie into the main AT&T PBX on the main campus and allow seamless functionality.

Tasks: 3.1 Order system
3.2 Install
3.3 Train users

Budget: $35,000

Timeline: Begin July of 1999

Objective 4:

Fund department and program technology plans submitted to the Information Services Committee. Include solicitation of plans from Student Services areas. Also include a campus-wide fund for technologies that benefit entire instructional program. Areas that have been deemed by the ISC as in need of funding are: Math, an Assessment Center, and International Students.

Budget: $850,000

Objective 5:

Build a lab with private funds to serve Extension, Continuing and Adult Education classes.

Budget: $0

Objective 6:

Connect Santa Monica College to the new Santa Monica City fiber loop. This loop will connect the major businesses and institutions in Santa Monica, and possibly beyond. The initial costs of connecting to the loop (trenching and equipment) will be reasonably quickly recouped by cost savings from leasing private lines. The initial loop will connect the main campus, the Academy, and Madison; the Airport will eventually be part of the fiber loop. Leased lines currently cost over $60,000 a year from GTE.

Tasks: 7.1: Evaluate trenching needs to city connect point
7.2: Order equipment
7.3: Connect and test system
7.4: Discontinue previous leased lines

Budget: $150,000 ($75,000 for trenching; $75,000 for equipment)

Timeline: Begin July of 1999

Objective 7:

Automate the delivery of video and multimedia to classrooms on the main campus, Madison, and at the Academy. A central, digital based system utilizing existing copper wiring and allowing pre-scheduled delivery from the Media center to PCs or monitors in the classrooms will allow instructors much greater access to video and multimedia presentations. Remote controls in the classroom allow the instructor to stop, rewind, etc. as if the equipment had been wheeled in from the Media Center.

There are 79 instructional classrooms on the main campus. Those already fitted with PCs can use the existing system to interface with the video system. At least 60% of the other classrooms will be fitted with large monitors and remote control devices.

Tasks: 8.1: Evaluate systems
8.2: Build control suite in new Media Center
8.3: Install monitors in most classrooms
8.4: Order equipment and install
8.5: Train instructors

Budget: $250,000

Timeline: Begin in July of 1999

Objective 8:

Develop or purchase online courses to train instructors who wish to develop online courses. Also, develop or purchase an online introductory course for students who will be taking online courses. The introductory course assures the instructor that the student knows the technology basics of interacting successfully in the online course environment.

Budget: $5,000

Objective 9:

Replace or add new servers. The growth of email, chat, listservs, the Internet and Intranet, as well as specific application servers, require the constant addition or replacement of servers.

Budget: $75,000

Objective 10:

Add an imaging jukebox so that imaged documents are easily accessible across the campus and from satellites.

The size of the imaging database will have grown to such proportions that older documents will need to be taken off-line and archived unless a jukebox is added. If the documents are off-line, it

will require manpower to continually load them when they are once again needed. An imaging jukebox will allow access to all documents at all times.

Budget: $50,000

Objective 11:

Augment distance education software with add-on hardware and software to supplement the program. The Associate Dean for Distance Education will address these needs in the Distance Ed Plan.

Budget: $15,000

Timeline: Begin July 1999.

Objective 12: (Year 4 of 4)

Continue to facilitate the integration of the Faculty/Staff lab and the Media Center. New multimedia workstations need to be purchased, as well as new furniture for the newly refurbished Lab in the Media Center.

Budget: $25,000 (for furniture)
$35,000 (for equipment)

TOTAL $60,000

Objective 13:

Finish implementation of integrated software system. This system will allow College constituents to obtain self-service to needed business functions.

Budget: $412,405 (allocated in original Plan; real cost to be determined.)

Timeline: System should go-live within 24 months of start of implementation, and thus should come online during this fiscal year.

Objective 14: (Year 3 of 3)

Continue to encourage integration of state of the art technology with instruction. The Director of Academic Computing and the Coordinator of Technology Training and Research will work to extend the number of classes that utilize multimedia and/or online teaching techniques.

Budget: $36,000

Objective 15:

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Upgrade the network to higher speed (622 MBPS ATM and/or Gigabit Ethernet)

As higher speed interfaces become routine and more video is travelling over the network, the main CellPlex ATM switches will need to be upgraded, and certain end users may require higher speed interfaces from workstations to their hubs.

Budget: $150,000

Objective 16:

Continue to support video production in the Media Center. The delivery of cable classes as well as the development of multimedia, will require re-equipping the control room and the studio room in the newly opened Media Center. (See Appendix I for details on the multimedia support services in the Media

Budget: $100,000

Objective 17:

Purchase software to integrate and augment the administrative software system. Certain "add-ons" to the chosen integrated software system will be required, such as those to transmit payroll information to the County, tie-ins to campus email from the workflow in the system, image management.

Budget:	Messaging server for email and workflow tie-in:	$25,000
	Payroll integration:	$20,000
	Imaging and SPEEDE integration with Student ed plan and degree audit:	$25,000
	Imaging integration with ID card system:	$25,000
		$95,000

Objective 18:

Augment student remote access server with 96 more modems to support main campus and distance education courses.

Budget: U.S. Robotics (3COM) Access server: $50,000

Summary Spreadsheet of Proposed Technology Objectives		
	Year 4: 1999 - 2000	
Obj. Number	Summary	Budget
Objective 1	*Develop new Master Plan for Technology*	$0
Objective 2	*Replace obsolete PCs and workstations*	$837,500
Objective 3	*Replace Airport telephone system*	$35,000
Objective 4	*Fund ISC technology plans for departments & stud. Serv.*	$850,000
Objective 5	*Build lab for Continuing and Adult Ed*	$0
Objective 6	*Connect to SM City fiber loop*	$150,000
Objective 7	*Video delivery system to classrooms*	$250,000
Objective 8	*Develop or purchase online training for faculty & students*	$5,000
Objective 9	*Replace or add new servers for email & applications*	$75,000
Objective 10	*Install imaging jukebox to store imaged records*	$50,000
Objective 11	*Augment distance ed software with add ons*	$15,000
Objective 12	*Integrate Faculty/Staff lab and Medida Center*	$60,000
Objective 13	*Finish implementation of integrated software system*	$412,405
Objective 14	*Integrate technology with instruction*	$36,000
Objective 15	*Upgrade network to 622 ATM and/or gigabit Ethernet*	$150,000
Objective 16	*Support video production in Media Center*	$100,000
Objective 17	*Software to support integration of administrative system*	$95,000
Objective 18	*Augment student remote access (dial in) system*	$50,000
	TOTAL	**$3,170,905**

Based upon historical levels of funding the Committee recognizes that $3.4 millions extremely optimistic. However, it seems inappropriate to prioritize the list at this time because the needs may change significantly in the next twelve months. It is also not a question of dropping items from the list because all 19 items are clearly needed by institution.

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SPECIFIC PERSONNEL NEEDS 1999-2000

Instructional Computing

- **Multimedia Specialist** - Assist faculty and staff in developing multimedia courseware and presentations; configure and install hardware and software for the multimedia workstations and other designated computers; act as a resource person for multimedia equipment purchases; assist in the operations of the faculty/staff lab.

- **Computer Lab Instructional Specialists** (number depends on new labs funded)

Information Management

- 1 **Manager of Information Management** - backup support for Director to keep projects on track during absences and to prioritize and delegate user requests
- 1 **Network Analyst II** - higher level network programming support
- 1 **Manager of Network Programming** - supervision of all network programming efforts
- 1 **Systems Analyst** - function analysis and implementation of new software

Telecommunications

- 1 **Microcomputer Specialist** - acts as primary support resource for faculty and staff computer software and hardware problems; operates college "help desk" which is a "hot line" for all campus computer and telecommunications problem reporting; assists staff with the installation and configuration of personal computers and related software and hardware; troubleshoots problems with hardware, software and network interfaces; performs minor repairs and arranges for major repairs with other college staff or outside vendors; keeps inventory and repair records.

- 2 **Telecom Technicians I** (Despite the addition of over 300 network nodes, no Telecom Tech II is being added because these are largely replacements of existing nodes and not overall growth.)

- 1 **Manager of Network Services** - (existing classification) with the growth of Telecommunications and the need to integrate domain and addressing structures more closely with the network analysts in Information Management, there is a need for a higher level management position to aid in the coordination between departments.

Media Center

- 1 **Video Technician** - (new classification) - Responsible for college video production and distribution including cable TV operations, satellite downlinks, and production of college telecourses, special events and promotional materials. Schedules programming for cable channel. Assists faculty and staff in preparing and producing program material. Operates and maintains video equipment as used in production, cable broadcast.

APPENDICES

APPENDIX B

4C@ONE Grant

THIS FORM MAY BE DUPLICATED BUT NOT REPLICATED

Chancellor's Office
California Community Colleges

District: Foothill-De Anza CCD
College: De Anza College
RFA Number: 96-0490

Program: Telecommunications Special Projects (TSP)

GRANT AGREEMENT

RFA Title: The Center for California Community Colleges at Outcomes Network for Educators Project (4C@O.N.E.)

TO BE COMPLETED BY COCCC

Renewable: ☐ Yes ☐ No First Year Funded: _____
Maximum Years to Renew: _____
Total Project Length: _____
Grant Agreement No.: _____ Date: _____
Amendment No.: _____ Date: _____
Funding Category: _____
Funding Source: _____
Amount to be Encumbered: $ _____
Prior Amount Encumbered: $ _____
Total Amount Encumbered: $ _____

This grant is made and entered into, by and between, the Chancellor's Office of the California Community Colleges, hereafter referred to as the State, and the aforementioned district, hereafter referred to as the Grantee. The grant shall consist of the RFA specification; this face sheet, with authorized signatures; the grant application, including all forms as specified in the Request for Application (RFA) packet; and the Grant Agreement Standard Terms and Conditions Articles I and II (Revs. 7/2/97 and 12/96), as set forth in the RFA instructions. All of these items are incorporated into this grant by reference.

The total amount payable for this grant shall not exceed the amount specified below in Grant funds. Compensation shall be made through periodic payments.

The term of this grant shall be from June 30, 1997, to and including July 31, 1999. All performance under this grant shall be completed by June 30, 1999, except that a Final Report must be received by the Chancellor's Office no later than July 31, 1999.

The signature of the chief executive officer or other authorized officer of the district legally binds the Grantee to perform the work specified in the attached proposal on the terms specified in that proposal. If any modifications are required to the attached proposal between the date of signature of this face sheet by the designated district officer and the date of signature by the Deputy Chancellor, each modified page must be initialed and dated by the Project Director.

STATE OF CALIFORNIA	GRANTEE
Item Chapter Statute Fiscal Year	District (Grantee): Foothill-De Anza
Object of Expenditure (*Code and Title*)	College: De Anza
Signature, Accounting Officer (*or authorized Designee*) >	Grant Funds: ..... Total $1,000,000 Total Matching Funds, if Applicable: $ 152,934
Project Monitor >	Project Director > Willie Pritchard
Agency: Chancellor's Office, California Community Colleges, 1107 Ninth Street, Sacramento, CA 95814-3607	District (Grantee) Address: 21250 Stevens Creek Blvd. Cupertino CA 95014
Signature, Chief Executive Officer (*or authorized Designee*) Date >	Signature, Chief Executive Officer (*or authorized Designee*) Date > Sandra C. Acebo 7/14/98
Printed Name of Person Signing > Gary L. Cook	Printed Name of Person Signing > Sandy Acebo
Title > Administrator, Fiscal and Business Services	Title > Vice President Instruction

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A. Santa Monica College has a Master plan for Education that was adopted by the Board of Trustees in July of 1997. It is stated therein:

> "Educational delivery systems are radically changing. New technology needs to be continually incorporated into instruction so that the College is always working to maximize academic excellence. The challenge is to blend pedagogical techniques optimally to match instructional delivery with student learning styles. The integration of technology will also be critical to the delivery of student services and academic support."

This commitment to integration of technology into the curriculum will be greatly facilitated by the appointment of the Coordinator of Technology Training and Research. The Coordinator will work closely with the Faculty to mentor the development of the type of new instructional delivery outlined in the Masterplan.

Employee training is also critical to the delivery of student services, and the sequence of classes outlined in this document will ensure that all employees know how to use their workstations effectively.

Santa Monica College also has a Masterplan for Technology 1996 - 2000, adopted by the Board of Trustees on February 10th 1997. Objective 12 for the current academic year states:

> "Implement training and professional development of faculty, staff and administration."

The four goals outlined in our expenditure plan for the TTIP Human Resources Fund will ensure that this objective is met.

The College plans to implement an integrated software system in the near future, as outlined in all four years' objectives in the Master Plan for Technology. With the advent of such a system, massive training efforts will be required in all segments of the College community. Without this training, faculty and staff will be unable to make a smooth transition from our current system to the new integrated system.

B. The College has an inventory of all workstations and servers on campus. As mentioned above, one of the major impediments to effective use of new technology, is the need for a coordinated training program for users of new technology. The College does not want to purchase equipment that becomes quickly obsolete for users who can not operate it efficiently. This underscores the need to have a Technology Training Plan at the College.

C. The Faculty are involved in the technology planning process at the College through the Academic Senate's Information Services Committee. In addition, the President of the Academic Senate, the Chair of the Information Services Committee, the Chair of the Professional Development Committee, and the Coordinator of Staff Development participated in the TTIP Human Resources planning process. The faculty has also participated in re-writing of Years 3 and 4 of the Master Plan for Technology through representation by the President of the

Academic Senate, and a Chemistry instructor who has a lead role in Santa Monica College's Virtual Office Hours project.. In addition, the newly created position of Director of Academic Computing has direct responsibility for ensuring that faculty needs for instructional technology are prioritized and met to the best of the College's ability. The Director of Academic Computing also coordinates plans with the Chair of Chairs at the College.

D. The College has decided that it is not cost-effective to develop most of its own training (with the exception of the four part workshops outlined above and standard in-house workshops that it has offered for many years). Therefore, a portion of the TTIP Human Resources Fund has been allocated to CBT or CD-ROM based instruction available to all employees for self-paced tutorials.

E. The College is implementing Year 2 of its Master Plan for Technology. This document was developed with input from all constituent groups on campus and was adopted by the Academic Senate, the Classified Senate, and the Board of Trustees. It is the guiding instrument for technology implementation on campus and has been closely followed in its first two years. Most of the objectives for Year 1 were fully implemented, and it is expected that most of the objectives outlined for Year 2 will also be fully implemented. The College is currently rewriting Years 3 and 4 due to the fast paced change in technology. The College is fully committed to planning in all areas as evidenced by its Technology Masterplan, Educational Masterplan, its Facilities Masterplan, and the recently adopted Santa Monica College Masterplan.

F. The College has already begun to send certain technology innovators to conferences and workshops during the past two years. With the availability of workshops offered by 4C@O.N.E., a broader spectrum of the campus will be able to attend workshops specifically designed for California community colleges. Santa Monica College has also undertaken the task of designating department technology liaisons who will be compensated for their work in developing department technology plans and their attendance at workshops and conferences specific to the technology needs of their individual department.

G. In the development of the Technology Masterplan, both faculty and staff were surveyed concerning their needs for training and access to technology. Focus groups were also held to inform the College community about the potential uses of technology. The on-going training objectives in each of the four years of the Plan reflect the outcome of those activities. The planning process at the College has been open, with many focus groups during the development of all plans, especially the overall Santa Monica College Masterplan that was recently adopted. These Plans are available on the College Internet, and in hard copy at several locations on campus. Every effort is made to educate the College community about new directions in technology. The Coordinator of Technology Training and Research will be invaluable in extending the communication process beyond current levels to those who may be less technology focused or less endowed with technology resources at present.

evaluating training materials, presenters, services, and delivery systems, and working with the department chairs and technology liaisons. The resulting Plan will be coordinated with the Academic Senate's Information Services Committee and the Classified Senate before adoption.

The Coordinator of Technology Training and Research will then oversee the implementation of the training plan for both faculty and staff, and will also work directly in mentoring faculty in developing courseware and multimedia presentations.

2.) Authorized Use of Funds -- Direct Training: Using Educational Technology

A four part workshop training series will be developed that will become mandatory for all faculty and staff who receive new District owned PCs or workstations. Other interested faculty and staff may participate on a voluntary basis. The purpose of this six-hour workshop series is to ensure that new technology purchases are used efficiently by recipients. The workshops are based upon a pilot project undertaken at the University of California at Berkeley (CAL PACT project). These one and a half-hour workshops the following topics:

- **Computer basics** -- using a GUI interface, windows, and a mouse. Basic Microsoft Office skills, copying and pasting between applications, using email, sending files electronically.
- **Internet skills** -- using the World Wide Web and a browser, finding resources on the Internet, discussion groups, listservs, chat.
- **The Santa Monica College computing environment** -- a survival course on connecting to and finding electronic resources on the College's servers, including the Internet and Intranet, creating home pages, using databases, library resources, understanding software policies and copyrights, using Virtual Office Hours (a SMC product that provides instructors with tools for virtual contact with students.)
- **Computer Ergonomics** -- correct use of computers to avoid workplace injuries and maximize effective use. Correct specification of computer furniture.

Experienced computer users will be able to test out of the first two workshops, but will be required to attend the latter two.

3.) Authorized Use of Funds -- Purchase of Self-Paced Training Tools and Services

The Coordinator of Technology Training and Research will make a recommendation to the Professional Development Committee on the acquisition of self-paced training, including vendor and quantity.

The Coordinator will consider the Chancellor's Office Telecommunication Technology Infrastructure Program/CBT Purchase Agreement with NETg™. Under the terms of this agreement, CBT software may be purchased at a 90% discount. The fee of $3.50 per staff member, full and part-time would provide a one-year site license for unlimited access to over 450 courses in computer training. The training can be accessed from the College's LAN or copied onto CD_ROM with unlimited duplication rights for staff development only.

4.) Authorized Use of Funds -- Introduction to Educational Uses of Technology ($5,000)

Participation in 4C@O.N.E. training. Santa Monica College is one of ten partners in the 4C@O.N.E. project and will leverage the training opportunities provided by this project. Possible uses of these funds, as approved by the Chancellor's Office include:

- "Attendance at seminars to address institutional impediments to the integration of technology into instruction and services, and educational structures and administrative strategies that support the effective integration of technology, beginning late spring, 1998.
- An intensive three-to-five-day 'Summer Institute for Faculty,' co-sponsored by the Community College Statewide Academic Senate, at CSU Monterey Bay. This will focus on lessons, models and procedures that demonstrate effective uses of technology-enhanced instructions and learning on June 15-19, 1998. The Projected fee, for this seminar will range from $600 - $750 depending on whether it is a three or five day training session. The fees include room and board.
- Region Training for trainers workshops for teams from your district that will build your local training offerings in effective applications of e-mail and the Internet, multimedia in the classroom, and self-paced tutorials focusing on effective teach8ing methodologies with the technology embedded into the model, beginning in Fall, 1998.
- Training for trainers and teams of people who will act as help desk and local experts for discipline specific questions on effective applications of technology.
- Workshops on the development of online courses and systems to support them.
- Training for building and maintaining online learning communities.
- Training in basic use and operation of educational equipment, software and communications systems.
- Training and coaching in the design of technology-based learning experiences and student services to promote access and student success or to meet community needs.
- Training and coaching in the implementation of … learning experiences in combination with pedagogues such as:
  - Use of learning objects and electronic media to display and explain concepts,
  - Management of e-mail, student discussion groups, electronic submission of assignments and Web-based research,
  - Use of appropriate technology to support project oriented, collaborative learning.
- Consultation in instructional design, technology needs assessment, evaluation and continuous improvement systems."

II. Planning Process

Santa Monica College has considered the following factors outlined in the Chancellor's office certification document in setting priorities for expenditure of the TTIP Human resources funds:

APPENDIX A

Chancellor's Office TTIP Human Resources Technology Training Plan

Santa Monica College
TTIP Technology Training Expenditure Plan for 1997-98

I. Goals and Objectives for Technology Training

The goal of the Technology Human Resources Training is to allow each faculty and staff member at the College to achieve excellence in the performance of his/her duties by having access to and training in state of the art technology which can assist in fulfilling assigned responsibilities. The program should open up innovative pathways in teaching and learning and motivate staff to pursue automation of business processes that will benefit the students of the College.

Need:

The College currently has no coordinated Plan for technology training of faculty and staff. With the advent of a new integrated software system on the horizon, and the infusion of technology dollars through the State technology block grants of the preceding two years, an increasingly large gap has developed between the skill set of the College community and the technical capabilities of newly acquired systems and technologies.

Existing College Plan:

As mentioned above, no current integrated Plan exists for technology training across all segments of the College community. The College does, however, offer weekly workshops led by a full time Instructional Technology Specialist. The Master Plan for Technology details over twenty objectives for implementation during the next academic year, many of which involve advanced technology. Among these objectives is the acquisition and implementation start of an integrated administrative software system. These factors necessitate the development of a coordinated plan, based upon research and consultation with appropriate entities at the College.

Authorized Use of Funds:

The four specific Objectives for the 1997-98 academic year are:

1.) Authorized Use of Funds -- Planning & Coordination and Faculty/Staff Development Center

Full reassigned time for a faculty member to assume the position of Coordinator of Technology Training and Research. This position will report directly to the Director of Information Resource Management. He/she will work with the faculty and the designated department technology liaisons during the 1998 calendar year to develop a three year plan that outlines which courses that will integrate technology into the curriculum in each successive semester, and that details the type and quantity of staff training needed to prepare for the campus wide implementation of an integrated administrative software system, as detailed in Objective 1 of the revised Master Plan for Technology - Year 3.

The Coordinator of Technology Training and Research will develop the plan by conducting needs studies, participating and interacting with the Professional Development Committee and Staff Development Coordinator, researching and

Information for the databases will be provided by instructional and student services faculty, staff developers, vendors and consultants. Given the scope and quantity of information involved, faculty participation will be essential in assuring that these databases remain current. The interface team will coordinate with staff of the On Line Curriculum and Instructional Resources project to ensure maximized content and accessibility for both sets of databases. The on line instructional content, multi-media tools, course outlines and syllabi for the On Line Curriculum project complement on line resources in this project.

a. EDUCATIONAL TECHNOLOGY CALENDAR will provide a "who, what, when, where, why" of staff development resources in educational technology. In order to provide the most current and accurate information possible for this calendar, the database will be structured to allow calendar input directly by those faculty, staff, and others providing workshops, courses and other staff development opportunities. The calendar will be searchable by identifiers such as institution, provider, date, location, topic, and title.

Flex Day Report -- For systemwide reporting and accountability purposes, an interactive database of educational technology flex day activities will be developed and implemented. This database will:

- allow authorized faculty, staff and administrators to author/enter information about technology-related staff development activities provided, including expenditures and participation rates
- allow all users to search this summary database.

b. FACULTY ELECTRONIC PUBLICATIONS AND DESIGN CENTER -- Educational Products and Methods. De Anza will design and implement an interactive database which allows developers and vendors of educational technology products to regularly contribute key information to allow California Community College faculty and staff to access the most current software and courseware information.

Real-time vendor and developer access to the database will allow vendors and community college, CSU and UC developers to provide the following:

- Vendor/developer information (name/address, city/state/zip, email)
- Web links to all vendor/developer sites
- Product/methods descriptions, costs, and system requirements, evaluation and outcomes data as available, e.g., vendor-provided links to research studies, student outcomes reports, etc.

The Faculty Electronic Publications and Design Center website databases allow community college faculty to submit educational technology studies and reports, including outcomes data and evaluation findings, in selected word-processing and desktop publishing formats (e.g., Microsoft Word, WordPerfect, Pagemaker, Framemaker, etc.). These materials will be archived to PDF (portable document format), catalogued and placed into a searchable environment, for retrieval systemwide. Preserving the integrity of intellectual property will be addressed in the design, possibly by allowing download, but not changes to specified materials. Information may include text and graphics and can be expanded to include digital video and audio resources as expanded bandwidth through 4CNet become available.

c. EDUCATIONAL TECHNOLOGY SERVICE PROVIDERS DATABASE -- An interactive database of service providers will allow technology staff development, providers, trainers and consultants to regularly provide key information about the services they provide. California Community College faculty and staff will have access to up-to-date information about: services offered; training materials; resumes/qualifications of providers, trainers and consultants; innovative instructional methods; and systemic transformation. The database will contain: name/address, city/state/zip, email, Web links, and synopsis of services offered.

d. KNOWLEDGE NEEDS EXCHANGE - In order to address the individual knowledge needs of CCC faculty throughout the state, De Anza will provide a highly interactive, Web-based threaded bulletin board system, listserve, FAQ and suite of chat rooms through which faculty can post questions and receive information about the use of educational technologies in real-time. This system will encourage interaction, partnership and collaboration among faculty across the state through electronic means. This system will also provide faculty the opportunity to discuss their experience, both positive and problematic, with products that vendors promote. Qualitative analysis of the content of threaded bulletin board systems and listserve exchanges will also allow for identifying training needs of users.

Objective 2-3: Determine the knowledge needs of CCC faculty and staff in telecommunications and educational technology; learning theory, effective instruction and use of technology; futuristics, organizational change and new management structures as measured by:

a. **Identification of optimum practices in effective use of educational technology at three levels of sophistication by December 31, 1997.**
b. **The collection of data regarding actual knowledge and use of educational technology by CCC faculty by January 31, 1998.**
c. **Production of a report identifying skills and knowledge gaps between effective practices and actual practices by February 28, 1998.**

A needs analysis team will be formed by six of the faculty member consortium team, who will work with the project director and research team comprised of personnel from Santa Barbara City College, Rancho Santiago College, the Research & Planning Group for CCC, the continuous improvement coordinator, and a researcher. The needs analysis will be based on a performance improvement model prevalent in industry, which will identify not only skills and knowledge needs that point to training solutions, but also environmental obstacles that point to policy and administrative solutions. The needs analysis will be conducted in cooperation with the Statewide Academic Senate, FACCC and 4CSD , and these organizations will be supplied "press releases" that will communicate to their constituencies the importance, goals and process for the training needs analysis. Members of their constituencies will have an opportunity to participate in early focus groups that will provide direction.

The team will start by asking the questions: "What kind of methodologies and technology will improve student performance?" "What methodologies and technology will improve access?" "What uses of technology in managing processes and student services contribute to student success?" With input from the Advisory Committee, 20-30 sites will be identified within the community colleges, CSU, UC, independent universities and businesses where the effective use of technology in instruction and management of educational processes is in evidence. Initial focus groups from the field will help the consortium team identify the instructional technology arenas that relate best to the mission of the community colleges, with at least one group focusing on staff and student services needs. These focus groups will also be an opportunity for the field to better understand the goals of 4C@ONE.

The faculty team will observe, have structured interviews, and survey personnel where the best is happening, covering the knowledge topics and practices specified in the RFA, with focus on effective practices in the use of technology in instruction and student management. The consortium team also will research the literature/resources available on effective use of educational technology in order to establish optimum performance and best practices for bench marking purposes. Since there is wide range of skills and institutional needs, and because the RFA calls for three levels of training, best practices will be identified at three levels of sophistication. The best practices behaviors may include specific information on the following: use of software and hardware to enhance classroom presentations; use of the Web and online resources, online course delivery; continuous presence/compressed video and distance learning formats; and student management and student services processes.

An additional survey instrument will be developed to find out to what degree faculty are actually using the educational technology found to be effective – and if not, why not? In cooperation with FACCC and the Academic Senate, the consortium team will survey community college faculty, staff development officers and CIOs throughout the 106 colleges to identify actual use of technology and practices among community college faculty and staff statewide. The survey will be designed to also determine perceived knowledge needs and expertise, as well as the preferences and constraints related to training. Personnel from Santa Barbara City College, Rancho Santiago College, and the Research & Planning Group for CCC will be involved in the survey development and analysis of data. Gaps in knowledge and skills will be identified. This data will be the best data to date and will help the project team and developer/trainer design courses that will help the largest numbers get to basic and progressively more skilled levels compared to best practice bench marks. It also will document environmental/institutional impediments, such as lack of: equipment, technical support, incentives and rewards, expectations, etc.

Objective 4: Using the outcomes of the needs analysis, develop a plan and recommendations for training college faculty and staff in effective use of educational technology by March 31, 1998.

The plan will identify institutional obstacles to effective use of technology by faculty, as well as address skills and knowledge needs through statewide training. From the conducted research, training recommendations for the effective uses of educational technology will be completed and ready for implementation by March 1998.

The Design of the Delivery System

Key principles, assumptions and elements that will govern the design of the delivery system are:

Early training delivery will be in consideration of current skills and technology in the colleges. The consortium has the expectation that the faculty who are currently not using technology will be more difficult to reach at this stage. Additional marketing of the project will be designed to engage this population. Live demonstration and training will have a place in statewide staff development for at least the near future. Even for faculty and staff comfortable with technology, distance learning formats may not be viable in one year since the colleges may not have the technological infrastructure to support delivery. The expectation is that distance formats will play a predominant role in the plan for continuation. Although the project will have numerous online courses, products and pilot training available to those faculty comfortable with technology, the thrust of the first year training will be to meet faculty where they are skill wise and lift them from that level. The project creates skilled technology ambassadors that will be part of the training mix in year two.

Distance learning formats will be used for training when feasible. The partners in the 4C@ONE virtual center have much expertise and understanding of distributed learning systems to draw upon when designing distance learning experiences and piloting for system delivery.

De Anza's large distance learning program has had high student success and retention rates among diverse populations, and there has been widespread faculty participation. The college has extensive experience in teleconferencing as a founding member of the Community College Satellite Network and is one of the few community colleges in the US to have both KU Band and C Band satellite uplink and downlink capabilities. DeAnza provided the content expertise for a recent teleconference on "Web Based Instruction" delivered from DeAnza'a TV Center , which was widely subscribed by both universities and community colleges nationally. This teleconference was in conjunction with the New Media Centers. De Anza is one of the few community colleges in the U.S. to be in the New Media Centers, a nonprofit consortium of colleges, universities and multimedia vendors which maintain a listserve for ongoing conversation between educators and developers about strategies for successful use of technology and evaluation of products. New Media Centers also provide beta testing sites for new equipment and software. The Dean of Technology is on the Board of this national organization. De Anza is currently developing Internet and Intranet applications which respond to needs of the industry in Silicon Valley. Nine new courses have been approved in topics such as web page design, JAVA programming language, and graphic design. Some of these courses will be delivered on-line and can be used for faculty training as well. Seventeen web-based courses on diverse topics are now scheduled for student enrollment in Fall 1997.

Videoteleconferencing (VTC) will be explored as the 4CNet backbone provides increased bandwidth to the system. The Dean of Communications, Learning Resources and Technology at the College of Marin has extensive expertise in compressed video through her UC experience. UC's "Toolkits" for faculty and staff participating in VTC, available to the 4C@ONE center through the College of Marin, include templates for developing:

- Student Handbooks covering logistical information, protocols for effective VTC, and active listening and learning strategies.
- Faculty Guidebooks covering logistical information, the compressed video environment, and fundamentals of visual/multisensory communications (e.g., graphics, multimedia tools, interactive handouts, distance learning study guides
- User Manuals which are entry-level, user-friendly basics for taining on, and troubleshooting of, compressed video equipment.

In addition, Santa Monica College, College of Marin and De Anza are developing the California Community College Multimedia/Entertainment Center, which will be a resource to all of California's community colleges interested in training students for the high growth multimedia industry. Rancho Santiago and Butte College bring extensive expertise in distance learning formats including on-line literacy training. Each of the colleges,

universities and industry partners involved has expertise that will be drawn upon for the training content and delivery systems.

Accessibility issues for special populations will be addressed. The High Tech Center Training Unit of the California Community Colleges at De Anza has ten years of experience in training community college faculty statewide in the use of assistive and instructional computer technology for students with disabilities. The High Tech Center Training Unit will contribute expertise about development of instructional technology, web sites, etc., that positively impact student outcomes, and expertise about assistive technology that provides access to targeted student populations.

Joint system planning with CSU and UC and K-12. Current projects provide the opportunity to create a universal system to serve all state educators. Training needed by cc faculty and staff in many instances will be useful to faculty and staff in other segments of education. As well, training needs uncovered through the needs analysis may already be addressed in the universities, or there will be opportunities for shared development and expertise. An economy of scale will maximize purchasing, licensing, and ideas in the state.

Build on successful experience in creating institutional change. At DeAnza, a tradition of incentives, awards and recognition for innovation has been useful in encouraging institutional change and individual growth. Stipends for development of training, courseware and other products will take advantage of the talents within the system. Also, the team will encourage the participation of part-time faculty through available on-line resources and instruction.

Utilization of established communication and delivery systems. Existing communication channels, conference and staff development venues will be used. Approachable, non-threatening teaching and learning centers will be in ten locations to train trainers so that colleges have on-site expertise.

Objective 5: Implement the training plan as demonstrated by:

a. **Development and delivery of at least 30 multimodule "train-the-trainer" and user training sessions, ranging in length from 1-3 days at lead colleges and other designated sites throughout the state by May 31, 1999.**
b. **Delivery of at least one videoconference for faculty and staff regarding criteria necessary at the institutional level for establishing an environment supportive of educational technology, by March 31, 1999.**
c. **Online posting of products developed by faculty, ongoing throughout the project.**
d. **Delivery of a three-day Summer Technology Institute for faculty, by September 1, 1999.**
e. **Delivery of four preconference or conference workshops at FACCC and Academic Senate Conferences by February 28, 1999.**

Since the training plan will be an outcome of the research and analysis done earlier in the project, content is not presumed and there will be flexibility in this implementation objective. Depending on the resources at the colleges by summer of 1998, possibly provided through an agreement with Pacific Bell and PicturTel, compressed video will be considered for delivery of training to faculty and staff. At the very least, we expect that there will be pilots with this distance format and others. All training opportunities will be advertised through the 4C@ONE website's Educational Technology Calendar, FACCC publications and website, Academic Senate, 4CSD and other established special interest group communication channels.

Live training will focus on train-the-trainer sessions for teams from colleges/districts who will receive materials and guidance on delivering Flex Day training, staff development workshops and ongoing support. One developer/trainer, selected for his/her expertise and knowledge of faculty needs and concerns, will travel primarily to lead college sites with equipment purchased through the project, but will also be available for on site sessions at colleges when feasible. All training and workshops will model best practices in instructional design and technology use.

Faculty will be encouraged to use the 4C@ONE as a resource and will be offered stipends to develop products and training modules which will be posted on the website's Faculty Electronic Publications and Design Center. We project that increasingly more resources will be available to faculty online through the 4C@ONE website and On line Curriculum and Ed Resource Center at the same time faculty throughout the state are

developing a comfort level in using these online resources. Faculty already making use of technology and interested in exposure to additional resources and expertise will be invited to apply for the Summer Technology Institute, designed for sharing best practices among early adopters. In addition, UC , CSU and industry opportunities for training will be made available through the development of partnerships.

Resources

Human and equipment resources needed for the project are addressed in the budget. Expertise needed for the development of training identified through the training needs analysis is expected to be available through the partnering institutions, organizations and businesses. If necessary, budget adjustments can be made in categories such as developer/trainer or faculty reassigned time.

Objective 6: Produce a detailed report that can act as a guide for local and systemwide policy development and replication of this project's systems by July, 1999.

Objective 7: Provide a business plan for continuing 4C@ONE on a self-supporting basis by July, 1999.

A detailed report addressing recommendations regarding optimum management of the distributed learning system will be prepared with recommendations regarding structure, budget, effective operations, equipment and personnel needs. The plan for continuation of the project will rely primarily on recommendations from the Advisory Committee for resource development. Outcomes of the study of specific faculty needs amounts to significant market research and it is expected that both industry partners and advocates such as FACCC will aid in identifying funding sources. The plan will address costs, revenue sources, possible fees, usage projections, and a marketing plan. The vision is that the plan would include intersegmental distributed learning systems. In addition it will include recommended policies or possible legislation to support technology-based learning and verifiable learning outcomes for students for the 21st century.

A videoconference covering the recommendations and plan for continuation will be delivered.

Distinctive Vision & Approach

This project design establishes a virtual organization in which faculty take a leadership role in the state's technology effort. The systems developed over a two year period for communication and management of staff and stakeholders will model effective systems in distributive learning. The statewide and faculty driven approach establishes a logistical infrastructure that can be affiliated with or supported by a number of existing organizations in the future, i.e., the proposed structure includes at least two consortium team members in each of the four Academic Senate "Areas." This new structure will facilitate the integration of resources and expertise from ten community colleges, relevant organizations and business to address the critical need for faculty-to-faculty and intersegmental collaboration on technology. The needs analysis is adapted from state-of-the-art performance improvement models in high performance companies, and industry expertise is integral to the identification of best practices and bench marks. Trained local teams, regional expertise and the online resources will support continued development in instructional technology. Of critical importance is the final plan for continued maintenance and support, based on the collective learning of all faculty and staff associated with this project.

Systemic change will be facilitated by the Advisory Committee's articulation of a compelling future vision in which students and faculty in all segments of higher education benefit, and a plan for achieving elements of the vision that is participatory and allows for learning to take place.

The leadership is committed to inclusion of the best thinking in the system in this project. To this end, if this proposal is successful, De Anza will consult with the Chancellor's Office regarding the integration of valuable ideas and approaches from other proposals, i.e., Cabrillo College's proposal. A collaboration would result in budget adjustments or a subcontract for specific services.

EVALUATION

This project will have both a formative evaluation and a summative evaluation. The Research & Planning Group for CCC will lend expertise to the evaluation design and analysis. The formative evaluation is for the purpose of strengthening the project and making adjustments which will lead to refinement in a continuous improvement cycle.

- Advisory Committee will convene with the consortium team to track and critique progress toward performance objectives, document problems and effective methods three times per year.
- Consortium team members will conference with the project manager on a weekly basis and adjust the workplan as needed to fulfill objectives.
- Consortium college faculty representatives will test survey for needs analysis.
- Consortium colleges will pilot test online mock-up of data bases and web pages.
- Staff development officers and faculty will assess pilot training and make recommendations for improvements.
- Project team, including the continuous improvement coordinator, will analyze the data being collected (see below) for indications of impediments to delivery of services, so that adjustments can be made.

The summative measurement for project years 1997-99 will be the accomplishment of performance objectives and delivery of products as listed. The performance outcomes and any adjustments as a result of formative evaluation will be summarized in the final report. The report will also identify specific contributors to the project and any additional outcomes not already anticipated. The evaluation components listed in the RFA will be addressed.

Questions that relate to impact are: "Has the website been used?" "Has the information on the website been useful to the target audience?" "Are faculty developing and sharing multimedia products? ...or sharing information on effectiveness?" "Did faculty and staff think the training useful?" "Have faculty increased their use of technology in instruction?" To aid the summative evaluation the following data will be collected:

- Numbers of hits to 4C@ONE web site; and number of hits for specific pages.
- Number of new courses, products or reports on effectiveness of methods posted online by faculty and staff, including student feedback and outcome measures.
- Approval ratings of web site and online resources, through a short online survey instrument.
- Approval ratings of trainings by participants.
- Use of educational technology in Spring, 1999, as measured by re-administering the survey developed in Fall,1997 to document the use of educational technology.

The project products that will be delivered with the final report or will be evaluated and addressed in the report are:

- The 4C@ONE Website, Educational Technology Calendar, Flex Day Report, Faculty Electronic Publications and Design Center, Educational Technology Service Providers Database, Knowledge Needs Exchange (Interactive bulletin board system, listserve, FAQ and suite of chat rooms)
- Report identifying optimum practices in effective use of educational technology at three levels of sophistication; data regarding actual knowledge and use of educational technology by CCC faculty; skills and knowledge gaps between effective practices and actual practices (training needs).
- Training Plan for the California Community Colleges
- Training curriculum and materials; thirty train-the-trainer and user training sessions
- Videoconference regarding criteria necessary at the institutional level for establishing an environment supportive of educational technology
- Online products developed by faculty
- A Technology Institute for faculty and four conference workshops or preconference sessions.
- Report that can act as a guide to local and state policy development and implementation
- Business plan for continuing 4C@ONE; Videoconference on the project and the plan for continuation.

WORKPLAN: The two-year Workplan, which clarifies activities and lines of authority, is attached.

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District: Foothill-De Anza CCD
College: De Anza College
RFA Number: 96-0490

APPLICATION ANNUAL WORKPLAN AND PERFORMANCE INDICATORS

Objectives	Activities	Responsible Person(s)	Timelines
1: Provide an information system that includes three interactive databases that permit colleges to report on, and access information for institutional and professional development activities, educational products and methods, and providers' services as demonstrated by the establishment, by December, 1997, of the: a. Educational Technology Calendar, b. Faculty Electronic Publications and Design Center, c. Educational Technology Service Providers Database, and d. Interactive bulletin board system, listserve, FAQ and suite of chat rooms. TSP Funds Budgeted: $239,950	1.1 Select a Project Director who has strong project management skills, oral and written communication skills; plus expertise in educational technology and training needs analysis, and an understanding of faculty concerns and needs regarding technology-related academic and professional matters.	De Anza project supervisor, consortium reps	August 1 - September 15, 1997
	1.2 Confirm consortium team (staff) members: one faculty person from each of the consortium colleges.	Project supervisor	August 1-15, 1997
	1.3 Contract for technical support/webmaster position who has skills in the development, implementation and support of Web sites for educational institutions and who possesses strong skills in interface design. With input from consortium team and the field, the technical support/webmaster will: a. evaluate hardware software needs identified under Objective 1 - purchase needed network bandwidth resources - purchase server hardware (2 NT servers) - purchase server software (webserver, database interface software and supporting utilities)	Project Supervisor, Consortium Team, technician	August 1-25, 1997

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District: Foothill-De Anza CCD
College: De Anza College
RFA Number: 96-0490

APPLICATION ANNUAL WORKPLAN AND PERFORMANCE INDICATORS

Objectives	Activities	Responsible Person(s)	Timelines
	- purchase applications software, e.g., PhotoShop, PageMill, Tango, etc.		
	b. setup/configure server hardware/ network linkages c. establish preliminary listserver, bulletin board and chat services to facilitate formation/communication between advisory committee, faculty work groups and project director c. test and evaluate web server d. install/configure database application and web/database interface prior to content definition, data element mapping and interface design	Project Supervisor, Consortium Team technician	August 15 - September 25, 1997
	1.4 Establish communication systems to be used by consortium team and Advisory Committee, ie, e-mail distribution name lists.	Consortium Team, technician	August 15 - September 5, 1997
	1.5 Confirm representatives for Advisory Committee from identified constituencies.	Project Supervisor, Consortium Team	August 1 - September 30, 1997
	1.6 Convene Advisory Committee with consortium team to review workplan and establish priority content for data bases, and design for Web Site.	Project Director, consortium team, Advisor Committee	October, 1997

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APPLICATION ANNUAL WORKPLAN AND PERFORMANCE INDICATORS

Objectives	Activities	Responsible Person(s)	Timelines
	1.7 Identify sub team of consortium team to specialize as a Website/database interface group, and process for input from the field.	Consortium team, Project Director	September 20, 1997
	1.8 Contract with specialized database/web interface programmer to write any necessary cgi code, design screens, develop reports, optimize database ops, design backup systems.	Project Supervisor, Project director	September 1-10, 1997
	1.9 Do mock model of 4C@ONE website, databases and bulletin board systems.	Webmaster, programmer, consortium team	September 15 - October 25, 1997
	1.10 Get input from Advisory Committee, consortium colleges' personnel.	Consortium website/database team, Project Director	October 25 - November 30, 1997
	1.11 Revise website.	Web master, programmer, consortium website/database team	November 30- December 30, 1997
	1.12 Contact and advertise to educational technology product developers the 4C@ONE website as an opportunity for market exposure.	Project Director, consortium team	November 1- December 30, 1997 and ongoing
	1.13 Advertise the site and its benefits to faculty and staff through articles/announcements in established communication formats for constituency groups, both electronic and hard copy.	Project Director, consortium team	December, 1997 and ongoing.

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APPLICATION ANNUAL WORKPLAN AND PERFORMANCE INDICATORS

Objectives	Activities	Responsible Person(s)	Timelines
Objective 2-3: Determine the knowledge needs of CCC faculty and staff in telecommunications and educational technology; learning theory, effective instruction and use of technology; futuristics, organizational change and new management structures as measured by: a. Identification of optimum practices in effective use of educational technology at three levels of sophistication by December, 1997. b. The collection of data regarding actual knowledge and use of educational technology by CCC faculty by January, 1997. c. Production of a report identifying skills and knowledge gaps between effective practices and actual practices by February, 1998. TSP Funds Budgeted: $200,850	3.1 Identify sub team of consortium team to focus on the needs analysis, with specific tasks in identifying optimum practices, actual practices and gaps. 3.2 Through Advisory Committee and other sources, identify 20-30 sites within the community colleges, CSU, UC and businesses where effective use of technology in instruction is in evidence. 3.3 Identify tentative areas of educational technology in which to document optimum practices. 3.4 Review survey instruments used to document the use of educational technology. 3.5 Meet with subject matter associations and convene focus groups to validate appropriate areas and to identify tentative levels of best practices that will aid in development of survey instrument.	Consortium team, Project Director Consortium Needs Analysis team Project Director Consortium team Consortium Needs Analysis team Consortium needs analysis team, Project Director	September, 1997 September 1-30, 1997 September 5 - 15, 1997 September 5-15, 1997 September 15 - October 15, 1997

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APPLICATION ANNUAL WORKPLAN AND PERFORMANCE INDICATORS

Objectives	Activities	Responsible Person(s)	Timelines
	3.6 Develop survey instrument, test with sample at a consortium college, and revise.	Researcher, Santa Barbara City VP, Consortium needs analysis team	September 20 - October 20, 1997
	3.7 Observe, survey and interview, selected personnel at 20-30 identified sites.	Consortium needs analysis team, Project Director	October 20 - November 10, 1997
	3.8 Review literature and other resources about optimum use of technology to enhance learning.	Consortium team	August 1 - November 10, 1997
	3.9 Review data and identify optimum practices at three levels of sophistication.	Consortium needs analysis team, researcher, Project Director	November 10 - December 10, 1997
	3.10 Revise survey for use in identifying actual use of educational technology in CCC. Include questions on reasons faculty are not using educational technology.	Researcher, consortium needs analysis team, Project Director	November 20 - December 20, 1997
	3.11 Survey, in cooperation with FACCC and the Academic Senate, a representative sample of community college faculty, staff development officers and CIOs to identify actual performance and practices among community college faculty and staff statewide.	Consortium team	January 1- 25, 1997

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APPLICATION ANNUAL WORKPLAN AND PERFORMANCE INDICATORS

Objectives	Activities	Responsible Person(s)	Timelines
	3.12 Review data, analyze statistically, represent graphically.	Researcher, Santa Barbara City VP, Project Director, Consortium team.	January 25 - February 15, 1998
	3.13 Identify gaps between optimum use and the average usage at three levels. .	Researcher, Santa Barbara City VP, Project Director, Consortium team	February 10 - 20, 1998
	3.14 Write report on findings.	Project Director, Consortium needs analysis team	February 20-28, 1998
	3.15 Distribute report electronically and summary of findings through established communication channels for FACCC, Academic Senate, 4CSD, etc.	Project Director	February 28 - March 15, 1998
Objective 4: Using the outcomes of the needs analysis, develop a plan and recommendations for training college faculty and staff in effective use of educational technology by March 31, 1998. TSP Funds Budgeted: $61,500	4.1 By analyzing data, determine predominance of lack of skills and knowledge as causes for gaps in optimum use of educational technology and the actual level of use at a minimum, intermediate and advanced levels.	Researcher, Project Director, Consortium Team	February 10-28, 1998
	4.2 Determine other obstacles to use of educational technology, i.e., lack of equipment, technical support, incentives or rewards, expectations, etc.	Researcher, Project Director, Consortium Team	February 10-28, 1998

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California Community Colleges

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CONTACT PAGE

TO BE COMPLETED BY COCCC
Grant Agreement No.:
Proposal ID No.:
Funding Status:
Fiscal Year:

Funding Source(s): Telecommunications and Technology Intrastructure Program
Project Title: 4 C @ O.N.E.
Institution: De Anza College
Address: 21250 Stevens Creek Blvd
City: Cupertino State: CA Zip+4: 95014 _ 5793

College President (*or authorized Designee*)
Name: Martha Kanter Title: President
Signature (*red or blue ink only*): Sandra C. Acebo for Martha Kanter
Phone: (408) 864- 8705 Date: July 24, 1997
Fax: (408) 864-5454 E-Mail Address: kanter@admin.fhda.edu

College Academic Senate President (*Appropriate Program Area*)
Name: Jim Haynes Title: President, De Anza Senate
Signature(*red or blue ink only*): Jim Haynes
Phone: (408) 864-8954 Date: July 24, 1997
Fax: (408) 864-5454 E-Mail Address: haynes@admin.fgda.edu

Responsible Administrator (*Appropriate Program Area*)
Name: Sandy Acebo Title: Vice-President, Instruction
Phone: (408)864-8716 Date: July 24, 1997
Fax: (408) 864-5454 E-Mail Address: acebo@admin.fhda.edu

Project Director
Name: Willie Pritchard Title: Dean of Technology
Phone: (408)864-5651 Date: July 24, 1997
Fax: (408) 864-5454 E-Mail Address: pritchardsh@admin.fhda.edu

Business Officer
Name: Jim Keller Title: Director, BUsiness Services
Phone: (415)949-6201 Date: July 24, 1997
Fax: (415) 949-1638 E-Mail Address: kellerj@admin.fhda.edu

District/College Project Contact
Name: Ann Koda Title: Instructor Computer Applications
Phone: (408) 864-8608 Date: July 24, 1997
Fax: (408) 864-5433 E-Mail Address: koda@fhda.edu

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza CCD
College: De Anza
RFA Number: 96-0490

APPLICATION ABSTRACT

TO BE COMPLETED BY COCCC

Grant Amount: $ 1,000,000

Project Title: 4C @ O.N.E.

Project Director: Willie Pritchard
Organization: De Anza College
Address: 21250 Stevens Creek Blvd
City: Cupertino State: CA Zip + 4: 95014 - 5793
Phone: (408) 864-5651

(Summarize in 250 words or less below.)

This project is designed to be a coordinated statewide response to the tremendous challenge of integrating technology into instruction to improve community college student outcomes, expand access and reduce per student cost. This project design establishes a virtual organization in which faculty take a leadership role in the state's technology effort. This new structure will facilitate the integration of resources and expertise from community college districts, business and other segments of education to develop a training process for faculty and staff to learn how to use current hardware and software to design effective learning experiences for community college students.

A consortium team, comprised of one faculty member from each of the ten partnering community colleges, will act as staff to the project and take the lead in analysis of needs, research of bench marking models, development of a training plan and best practices criteria, and act as a website and data base interface team. CSU and UC will be called upon for planning, expertise in instructional design and coordination with the 4CNet infrastructure. The lead community colleges will become regional training sites for training trainers from other districts.

As the 4C@ONE Center, De Anza will provide online database resources to faculty and staff regarding professional development opportunities, available courseware and products, and service providers. A highly interactive bulletin board system, listserve, FAQ and suite of chat rooms will address individual knowledge needs, allow interaction and collaboration across the system and educational segments.

An Advisory Committee, comprised of high-level industry and education representatives, will give policy direction to the project, voice to relevant constituencies and play a key role in identifying resources for continued funding of the project. Of critical importance is the final plan for continued maintenance and support, based on the collective learning of the statewide participants, to support technology-based learning and verifiable learning outcomes of community college students for the 21st century.

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza CCD
College: De Anza College
RFA Number: 96-0490

APPLICATION CONSORTIUM DATA SHEET

☐ · Please check here if this proposal is a consortium project

Complete the following information for each college of the consortium. Use additional sheets if required. Attach this form directly behind the Contact Page.

District/College: Butte Community College District/Butte College
Address: 3536 Butte Campus Drive
City: Oroville State: CA Zip+4: 95965-8399
Project Contract: Fred Sherman Phone: 916-895-2433
Amount of dollars contributed to project by the district/college: $6,000
Roll of district/college in the consortium design: Butte College will have a faculty member on the project's Consortium Team, serve the northern area of the state, host train-the-trainer sessions and will lend espertise in distance learning technology acquired through the college's experience and partnership with Chico State University.

District/College: Chabot-Las Positas Community College District/Las Positas College
Address: 3033 Collier Canyon Road
City: Livermore State: CA Zip+4: 94550-9797
Project Contract: Robert Breuer Phone: 510-373-4915
Amount of dollars contributed to project by the district/college: $6,250
Roll of district/college in the consortium design: Las Positas College will have a fuculty member on the project's Consortium Team, host train-the-trainer sessions for the East SF Bay Area and will draw on their long-standing relationship with Livermore and Sandia Laboratories. as a resource for this project.

District/College: Los Angeles Community College DIstrict/Los Angeles Trade-Tech College
Address: 400 W. Washington Boulevard
City: Los Angeles State: CA Zip+4: 90015-4108
Project Contract: Polly Garstka Phone: 213-744-9005
Amount of dollars contributed to project by the district/college: $9,300
Roll of district/college in the consortium design: Los Angeles Trade-Tech COllege will have a faculty member on the project's Consortium Team, support instructional technology development in the Los Angeles CCD and serve as the train-the-trainer site for the Los Angeles CCD.

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Application Consortium Data Sheet *(Continued)* **RFA Number:** 96-0490

District/College: Marin Community College District/College of Marin
Address: 835 College Avenue
City: Kentfield **State:** CA **Zip+4:** 94904-2590
Project Contract: Teri Frongia **Phone:** 415-485-9502
Amount of dollars contributed to project by the district/college: $4,500
Roll of district/college in the consortium design: College of Marin will have a faculty member on the project's Consotium Team, support instructional technology development in North SF Bay Area and will lend extensive experience in faculty development in use of the WWW and compressed video; and multimedia industry partners interested in participating in 4C@ONE.

District/College: Rancho Santiago Community College District/Rancho Santiago College
Address: 1530 West 17th Street
City: Santa Ana **State:** CA **Zip+4:** 92706-9979
Project Contract: Robert B. Jenkins **Phone:** 714-564-5000
Amount of dollars contributed to project by the district/college: $6,000
Roll of district/college in the consortium design: Rancho Santiago College will have a faculty member on the project's Consortium Team, host train-the-trainer sessions and serve the Orange County area; and will lend research expertise to the project, and expertise in online and computer aided literacy training.

District/College: San Diego Community College District/San Diego Miramar College
Address: 10440 Black Mountaing Road
City: San Diego **State:** CA **Zip+4:** 92126-2999
Project Contract: Ric Matthews **Phone:** 619-536-7800
Amount of dollars contributed to project by the district/college: $7,000
Roll of district/college in the consortium design: San Diego Miramar College will have a faculty member on the project's Consortium Team, and host train-the-trainer sessions for the San Diego and Imperial Valley as the lead site, and will provide integration with the Academic Senate's Tech Committee.

District/College: Santa Barbara Community College District/Santa Barbara City College
Address: 721 Cliff Drive
City: Santa Barbara **State:** CA **Zip+4:** 93109-2394
Project Contract: Bill Hamre **Phone:** 805-965-0581
Amount of dollars contributed to project by the district/college: $11,280
Roll of district/college in the consortium design: Santa Barbara City College will have a faculty member on the project's Consortium Team, support instructional technology development and training in the Central Coast area and will provide expertise in research design and statewide technology infrastructure.

Application Consortium Data Sheet *(Continued)* **RFA Number:** 96-0490

District/College: Santa Monica Community College District/Santa Monica College
Address: 1900 Pico Boulevard
City: Santa Monica **State:** CA **Zip+4:** 90405-1628
Project Contract: Cherry Li **Phone:** 310-450-5150
Amount of dollars contributed to project by the district/college: $ 23,084
Roll of district/college in the consortium design: Santa Monica College will have a faculty member on the project's Consortium Team, host train-the-trainer sessions and will serve the Greater Los Angeles area. Multimedia industry and resource development expertixe will aid in development of the continuation plan.

District/College: State Center Community College District/Fresno City College
Address: 1101 E. University Avenue
City: Fresno **State:** CA **Zip+4:** 93741-0002
Project Contract: Bill Seaberg **Phone:** 209-442-8206
Amount of dollars contributed to project by the district/college: $ 9,200
Roll of district/college in the consortium design: Fresno City College will have a faculty member on the project's Consortium Team, host traini-the-trainer sessions ofr the Central Valley and brings expertise in a K-16 training model with partners CSU, Fresno and the Fresno Office of Education.

District/College: California State University, Hayward
Address: 25800 Carlos Bee Boulevard
City: Hayward **State:** CA **Zip+4:** 94542-3001
Project Contract: Dr. Jodi Seuatius **Phone:** 510-885-4723
Amount of dollars contributed to project by the district/college: $ 0
Roll of district/college in the consortium design: California State University, Hayward will offer intructional technology, consultation, professional development courses for community college faculty and graduate student interns for the project.

District/College: California State University, Fresno
Address: 2225 East San Ramon, MS 121
City: Fresno **State:** CA **Zip+4:** 93740-8029
Project Contract: Dr. Robert Threlkeld **Phone:** 209-278-2058
Amount of dollars contributed to project by the district/college: $ 0
Roll of district/college in the consortium design: California State University, Fresno will offer instructional technology, consultation, professional development courses for community college faculty and graduate student interns for the project.

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Application Consortium Data Sheet *(Continued)* RFA Number: 96-0490

District/College: San Francisco State Univercity
Address: 1600 Holloway Avenue
City: San Francisco State: CA Zip+4: 94132
Project Contract: Vicki Casella Phone: 415-338-6455
Amount of dollars contributed to project by the district/college: $ 0
Roll of district/college in the consortium design: San Francisco State University will offer instructional technology, consultation, progessional development courses for community college faculty and graduate student interns for the project.

District/College: San Jose State University
Address: One Washington Square
City: San Jose State: CA Zip+4: 95112-0001
Project Contract: Victoria Harper Phone: 408-924-2459
Amount of dollars contributed to project by the district/college: $ 0
Roll of district/college in the consortium design: San Jose State University will offer instructional technology, consultation, professional development courses for community college faculty and graduate student interns for the project.

District/College: University of California Office of the President
Address: 200 Lakeside Drive, 18th Floor
City: Oakland State: CA Zip+4: 94612-3550
Project Contract: Carol Tomlinson-Keasey Phone: 510-987-9413
Amount of dollars contributed to project by the district/college: $ 0
Roll of district/college in the consortium design: Dr. Carol Tomlinson-Keasey, the UC system's lead person on Teaching and Learning Technologies, will play an advisory role in the project, representing the UC President's Office.

District/College:
Address:
City: State: Zip+4:
Project Contract: Phone:
Amount of dollars contributed to project by the district/college: $
Roll of district/college in the consortium design:

DeAnza College

4C@ONE: A Virtual Center for Learning

BACKGROUND and INTRODUCTION:

De Anza College, located in the heart of Silicon Valley, has been a leader among community colleges in the innovative use of technology in the delivery of instruction and services to thousands of students. In the early 1980s, De Anza began using computer based instructional models to overcome traditional problems inherent in teaching to a broad, diverse population. In 1994 De Anza opened the state's first Advanced Technology Center (ATC) and is one of the very few community colleges nationally to hold a Class-B Internet site license. De Anza's Distance Learning Center, one of the largest programs in the state with approximately 7,000 enrollments a year, has demonstrated success in offering a variety of credit courses through television, mixed media, and on-line. This year, two of the six strategic goals of the college encourage the enhanced "use of technology to create more flexible and responsive systems and course delivery" to further the "development of programs and courses unique in Silicon Valley for innovation." The college supported these goals through stipends to 11 faculty across diverse disciplines to develop on-line courses via the web and e-mail. De Anza recently received national recognition from the League for Innovation in the Community College for its implementation of its on-line Internet Admissions and Registration process, the first community college in the U.S. to offer such a service. In May, 1997 De Anza College was named "most wired" community college in America by Yahoo Internet Life magazine. De Anza College also has a longstanding commitment to, and demonstrated history of, collaboration with many community colleges in California and nationally to improve student learning through technology.

De Anza College proposes to build on the college's understanding and success in the use of educational technology by taking a leadership role in creating a logistical and technical infrastructure to support faculty development in this arena. De Anza proposes a coordinated response through a partnership with other community colleges, universities and relevant organizations to create a seamless blending of unique strengths and a one-of-a-kind model center.

Project Purpose

The California Community Colleges are faced with the opportunity and challenge, under the terms of the Telecommunications and Technology Program, of maximizing the eminent capability for increased point-to-point communication and media through networks and technological infrastructure. The opportunity to improve student outcomes, expand access, and reduce costs and duplication of effort is enormous. The challenge is to effectively demonstrate to faculty and staff and other stakeholders technology's potential for positively impacting post secondary education. As a tool, technology can enhance instruction for students with different learning styles; improve communication and student management; improve student services; and, through distance education, provide access to quality educational experiences to immensely diverse population groups. Assurance that under represented students have access to the tools of technology, and attention to cultural norms that impact the learning process will be imperative. The further challenge is to empower the over 60,000 faculty and staff in the system with the skills and knowledge to use current technology to design effective learning experiences themselves, to build on successful models, and to create new blends of face-to-face and technology based learning environments that assist students in attaining high standards of competence. Making administrations aware of the critical environmental factors and institutional structures that will support innovative methodologies and effective use of educational technology is yet another challenge.

There exists a window of opportunity for the California Community Colleges to work cooperatively statewide and with other segments of education, related organizations and industry to truly transform California's higher education opportunities for students. The 4C@ONE project, along with companion projects for On-Line Curriculum and Instructional Resources and the 4C NET-Backbone Upgrade, will allow and encourage the community colleges to provide classroom instruction integrated with media; on-line and web-based instruction, counseling and advisement; interactive video, both to the desktop and the classroom -- distance education options

that will cross district and segment boundaries. Technology and resources through these and other telecommunications projects will relieve faculty isolation, provide banks of courses and techniques, provide flexibility to address individual student learning issues, and release people from burdensome day to day maintenance activities to think more creatively about how to help students. *This is no less than using the power of technology to liberate learning.* Community college faculty have shown that they want to know more. In a March 1997 FACCC survey, 64% of the respondents including Academic Senate Presidents, staff development officers and random faculty, ranked educational technology as the number one training need for faculty.

The influx of students to community colleges in the coming years, among them the most culturally diverse and economically disadvantaged in our society, requires new strategies from institutions, faculty and staff. The inefficiency of independent institutions each struggling with the integration of technology is inappropriate. The dichotomy is that technology allows for sharing more, and for customizing more. The current interest and funding provide an unprecedented opportunity to reconfigure the learning environment to meet increasingly complex needs and fulfill the mission of the California Community Colleges.

Input From Stakeholders & Partnerships

In order to assure that community college faculty, staff and other stakeholders have adequate input into the content, structure, and delivery process for training under this project, De Anza College has developed a virtual organization, inclusive of other institutions and organizations who have relevant expertise, strategic locations and alliances. The virtual 4C@ONE Center will model the use of technology. Faculty from ten community colleges located throughout the state covering geographic regions and dense population areas will be paid staff to the 4C@ONE Center. These faculty will be the lead people on work teams that will be reinvented for different tasks such as website and database interface, needs analysis, research of bench marking models, and development of a training plan. This consortium staff will also take the lead on soliciting input and sharing information with faculty and staff in established professional associations and allow for regional input from mainstream faculty through face to face meetings and focus groups. Sharing information and soliciting input from early adopters of technology will be through on-line communication systems. Systematic input from community college stakeholders will be through the research phase of the needs analysis (see Objective 2).

The community colleges partnering with De Anza in the virtual 4C@ONE Center have statewide locations. These districts bring expertise in technology, research and staff development, as well as faculty representatives who are key opinion leaders needed to influence change within the system. Local Academic Senates and Staff Development Offices at each of the colleges will be integral to communication with faculty throughout the project. The community college partners in this project are:

- Butte College will serve the northern area of the state and will lend expertise in distance learning technology acquired through the college's experience and partnership with CSU, Chico. Butte will provide the interface with the 4C NET Backbone project for which they are the lead.
- College of Marin will lend extensive experience in faculty development in instructional uses of the WWW through Jim Locke, former statewide Academic Senate president; and expertise in the use of compressed video (videoteleconferencing) through Terri Frongia, a former UC Manager of Distance Learning. Marin is a consortium partner with De Anza in the CCC Multimedia/Entertainment Center and has close industry partners in multimedia.
- Las Positas College, in Chabot-Las Positas CCD, will provide support for the East SF Bay Area and will draw on their longstanding relationship with Livermore and Sandia Laboratories as a resource to this project, as well as their close working relationship with CSU, Hayward.
- Fresno City College, with the support of State Center CCD, will be the site for the Central Valley and brings in a partner, Fresno State University (CSU-Fresno). Fresno City College brings experience in a K-16 model for faculty development in the use of educational technology, in partnership with CSU, Fresno and the Fresno County Office of Education.
- Santa Barbara City College will provide expertise in research design through CIO Jack Freidlander, and statewide technology infrastructure through Associate VP, Bill Hamre, who was formerly the CCC Vice

Chancellor for Technology. Santa Barbara will also support instructional technology development in the Central Coast area.

- Santa Monica College, a partner in the CCC Multimedia/Entertainment Center, will serve the Greater Los Angeles area. Santa Monica has a strong, highly visible multimedia industry advisory committee and SMC's Vice President is on the 2005 group, futurists making recommendations re emerging needs in higher ed.
- Los Angeles Trade-Tech College will support instructional technology development in the Los Angeles CCD and serve as the lead site for the LACCD.
- Rancho Santiago College will serve the Orange County area, bringing a remarkable history of research expertise to the project through Julie Slark. Rancho Santiago has expertise in online technical assistance and training through the three million dollar National Workplace Literacy Program in partnership with Coast CCD, and other literacy programs using technology.
- San Diego Miramar College, with the support of the San Diego CCD, will serve the San Diego and Imperial Valley as the lead southmost site. San Diego Miramar's Ric Mathews, chair of the Technology Committee for the Statewide Academic Senate, provides an important perspective on faculty needs and necessary integration with the Academic Senate goals.

Each of the community college partners will host regional training sessions. Through faculty members staffing the project's Consortium Team, each will provide support to their regions. Additionally the principals of inclusiveness and widespread participation in project development will drive an openness to faculty from other colleges and universities on project teams. Institutions that have already indicated an interest are Foothill College, San Diego Mesa College, Chabot College, and West Valley-Mission CCD.

An *Advisory Committee* will give policy direction to the project and voice to relevant constituencies. The composition of the group will include: three CEOs of community colleges, CCC Academic Senate, FACCC, CSU, UC, K-12, CC Management Information Systems Consortium, 4CSD, 4CNet, three representatives from relevant private companies; and the 4C@ONE Project Director. The group will convene three times during each year, with the ten-faculty consortium team and communicate electronically. The Advisory Committee will play a critical role by: articulating a compelling future vision, setting policy; representing interests of important constituencies; facilitating access to state-of-the-art educational technology models; and resource development. This advisory group will be shared by the On Line Curriculum and Instruction Resource Center and will coordinate the on-line resources for faculty and staff. Particularly, issues important to both projects regarding ownership of intellectual property will be addressed by the Committee.

The *organizations* that have agreed to partner in this project are:

- The Academic Senate for California Community Colleges (ASCCC) which provides governance and oversight on behalf of 60,000 community college faculty on academic and professional policy matters. As well as serving on the project's Advisory Committee, the ASCCC will co-sponsor statewide professional development opportunities, in addition to dissemination support through its publications.
- Faculty Association of California Community Colleges (FACCC) represents the collective interests of all faculty through advocacy and professional education. FACCC will sponsor preconference workshops, and will disseminate information to faculty through its quarterly journal which is read by 20,000 faculty and through its website which get 24,000 hits per month. FACCC will play a key role after the needs in instructional technology have been identified by advocating to the legislature for the funding necessary to effectively meet those needs.
- Research & Planning Group for the California Community Colleges whose leadership is drawn from institutional researchers in community colleges, will aid in the project survey and evaluation.
- 4CSD, the California Community Colleges Staff Development organization will play a lead role on the project's Advisory Committee and provide expertise on the design and dissemination of technology staff development offerings as part of this project.
- League for Innovation in the Community College will introduce a new website called the Technology and Learning Community (TLC) in August, 1997, which will feature a searchable member database to foster interaction among technology users; on-line discussions and forum with editorials and best practices; and an extensive corporate partner exhibit. The 4C@ONE website will be linked and the League staff will collaborate with the 4C@ONE project team.

Four *California State Universities* that have agreed to be part of the 4C@ONE virtual center are: San Francisco State University, Cal State Hayward, San Jose State University and Fresno State. These institutions have had ongoing working relationships with one or more of the community colleges staffing the project. CSUs will offer instructional technology, consultation, professional development courses for community college faculty, and have been invited to provide graduate student interns for the project. *The University of California* system's lead person on Teaching and Learning Technologies, Dr. Carol Tomlinson, will also play an advisory role in the project, representing the UC President's Office.

The consortium has already secured support from *industry partners* with whom the colleges have working relationships including: Broderbund Software (Carmen San Diego), Tandberg/Canvas Visual Communications division (compressed video products), Oracle (database software), Silicon Graphics (multimedia computers), Hewlett Packard, Apple Computer and Cisco Systems. The consortium colleges, collectively, have numerous other industry partners that will be called upon for expertise, demonstration of equipment or systemwide licensing. On the Advisory Committee, the consortium intends to include high level corporate representation from companies that have involvement with the technological infrastructure for the CCCs or interest in educational technology, such as MCI, Adobe Systems and Microsoft.

The director of *Smart Valley*, a Silicon Valley non-profit organization with representation from industry, K-12, and higher education, has committed to working with the 4C@)NE project to represent their unique interests in education, bring resources to the project and utilize products for the K-12 constituency. The experience of partners, Fresno City College and CSU, Fresno will serve as a model for shared K-16 staff development in technology.

PERFORMANCE OBJECTIVES

Objective 1: Provide an information system that includes three interactive databases that permit colleges to report on, and access information for institutional and professional development activities, educational products and methods, and providers' services as demonstrated by the establishment, by December 31, 1997, of the:

a. **Educational Technology Calendar,**
b. **Faculty Electronic Publications and Design Center,**
c. **Educational Technology Service Providers Database**
d. **Interactive bulletin board system, listserve, FAQ and suite of chat rooms**

As the lead for the 4C@ONE center, De Anza will develop a series of web-based, user friendly, highly interactive, forms-based databases which will provide access via the 4CNET. De Anza has a well-designed, well-managed and extensive web site with program and course information, on-line data bases, as well as on-line registration. The consortium community colleges offer extensive experience in the development, design and implementation of sophisticated databases which will be easily accessed through a 4C@ONE web site. These database systems and network access linkages will first be designed to allow access by several thousand users each day and they will be developed so to support upgrade and expansion as the 4CNET system expands and user load increases beyond the design capacity of the initial system.

Process for Design and Testing

A website and database interface team of about four of the ten faculty members on the consortium team will be formed. The interface design team will solicit advice and feedback from the field and will consult with the Chancellor's Office to assure user friendly design of menu pages, etc. The design will incorporate technology found by HP research to be the most effective. The High Tech Center Training Unit of the California Community Colleges, a resource housed at De Anza, will provide a three-day training session in development of web pages that are universally accessible to students with disabilities for the faculty consortium team. Testing will be done at the campuses represented in the 4C@ONE virtual center.

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98
Source of Funds: Telecommunications & Technology Infrastructure Programs

Object of Expenditure	Classification	Amount
5000	Service Contract for Web Server	2,000
6000	2 NT Wev Servers	24,000
6000	Computers 3 Center Staff -- 2 Laptop for Training Development	23,000
6000	Printer, Scanner, Fax for Center	4,000
	Total Direct Cost	480,000
	Total Indirect Costs (4% of line 8) *See specific RF*	20,000
	Total Program Cost	$500,000

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1998-99
Source of Funds: Telecommunications & Technolog Infrastructure Programs

Object of Expenditure	Classification	Amount
1210	Project Director (12 months)	65,000
1260	Trainer/Developer (12 months)	60,000
5000	10 Faculty Reassigned Time @ $10,000 each from each Consortium College	100,000
2350	Staff Assistant (Hourly) 1200 hours @ $15/hr.	18,000
3000	Benefits for Trainer	18,000
4000	Printing/Supplies/Promotion Materials	12,200
4000	Computer Software for Training	24,200
5000	Contract Programmer 100 Hours @ $50/hr.	5,000
5000	Contract Web Support Technician 500 hours @ $50/hr.	25,000
5000	Faculty (10) Stipends for Training Modules 10 @ $2,500 each	25,000
5000	Contract Researcher 200 hours @$50/hr.	10,000
5000	Contract Continued Improvement Coordinator 240 hours @ $50/hr.	12,000
5000	Summer 1998 Faculty Institute	10,000
	Total Direct Cost	
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	(See Page Two)

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:hancellor's Office
:alifornia Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1998-99
Source of Funds: Telecommunications & Technology Infrastructure Programs

Object of Expenditure	Classification	Amount
5000	Travel 10 Consortia Faculty/Director	25,000
5000	Video Conference	7,500
5000	T-1 Line CHanges	12,000
5000	Services Contract for Web Server	2,400
6000	Computers -- 13 Laptop for Traveling Training Lab	48,100
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	Total Direct Cost	480,000
	Total Indirect Costs (4% of line 8) *See specific RF*	20,000
	Total Program Cost	$500,000

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98
Source of Funds: De Anza College Matching

Object of Expenditure	Classification	Amount
1210	Dean Technology 5%	5,760
2350	District Network Support Staff 100 Hours @ $25/hr.	2,500
2350	District Clerical Assistance Staff 100 hours @ $15/hr.	1,500
5000	Summer Institute for 1997	10,000
5000	Telephone and Fax Expenses	2,400
3000	Benefits for Project Director	18,000
	78	
	Total Direct Cost	40,160
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$40,160

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1998-99
Source of Funds: De Anza College Matching

Object of Expenditure	Classification	Amount
1210	Dean Technology 5% Supervision	5,760
3000	Benefits for Director	18,000
2350	District Network Technical Support 100 hours @ $25/hr.	2,500
2350	District Clerical Support 100 hours @ $15/hr.	1,500
5000	Telephone and Fax Expenses	2,400
	79	
	Total Direct Cost	30,160
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$30,160

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Butte College Matching

Object of Expenditure	Classification	Amount
	1997-98	
3000	Faculty Benefits 20% * 20,000	4,000
	1998-99	
3000	Faculty Benefits 20% * 10,000	2,000
	80	
	Total Direct Cost	6,000
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$6,000

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Las Positas Matching

Object of Expenditure	Classification	Amount
	1997-98	
2140	Classified Instructional Designer/Developer 125 hours @ $20	2,500
6000	Pentium 120 MHZ Computer for Faculty	2,500
TOTAL 1997-98		$5,000
	1998-99	
2140	Classified Instructional Designer/Developer	1,250
TOTAL 1998-99		$1,250
	Total Direct Cost	6,250
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$6,250

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0484

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Los Angeles Trade Tech Matching

Object of Expenditure	Classification	Amount
	1997-98	
3000	Faculty Benefits 31% * $20,000	6,200
	1998-99	
3000	Faculty Benefits 31% * $10,000	3,100
	82	
	Total Direct Cost	9,300
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$9,300

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: College of Marin Matching

Object of Expenditure	Classification	Amount
	1997-98	
6000	Distant Learning Equipment 5% of $45,000	2,250
	1998-99	
6000	Distant Learning Equipment 5% of $45,000	2,250
	83	
	Total Direct Cost	4,500
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$4,500

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Rancho Santiago Matching

Object of Expenditure	Classification	Amount
	1997-98	
3000	Faculty Benefits 20% * 20,000	4,000
	1998-99	
3000	Faculty Benefits 20% * 10,000	2,000
	84	
	Total Direct Cost	6,000
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$6,000

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: San Diego Miramar College Match

Object of Expenditure	Classification	Amount
	1997-98	
3000	Faculty Benefits 10% * 20,000	2,000
6000	Faculty Pentium Computer and Portable	4,000
TOTAL 1997-98		$6,000
	1998-99	
3000	Faculty Benefits 10% * 10,000	1,000
TOTAL 1998-99		$1,000
	85	
	Total Direct Cost	7,000
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$7,000

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Santa Barbara City College Match

Object of Expenditure	Classification	Amount
	1997-98	
2140	Jack Friedlander 5% for Research & Evaluation	4,390
6000	Faculty Pentium Computer	2,500
TOTAL 1997-98		$6,890
	1998-99	
2140	Jack Friedlander 5% for Research & Evaluation	4,390
TOTAL 1998-99		$4,390
	86	
	Total Direct Cost	$11,280
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$11,280

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Santa Monica Matching

Object of Expenditure	Classification	Amount
	1997-98	
1210	Project Administration (Cordinator, Distant On-Line Education) 2% * $70,000/yr	1,400
2000	Clerical Support 10% * $26,000/yr	2,600
3000	Benefits @ 30%	6,999
5000	Other Operating Expenses: Reprographics, Postage, Telephone, Fax	2,000
TOTAL 1997-98		$12,999
	1998-99	
1210	Project Administration 2% * $70,000/yr.	1,400
2000	Clerical Support 10% * $26,000/yr	2,600
3000	Benifits @ 30%	4,085
5000	Other Operating Expenses: Reprographics, Postage, Telephone, Fax	2,000
TOTAL 1998-99		$10,085
	87	
	Total Direct Cost	23,084
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$23,084

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Chancellor's Office
California Community Colleges

District: Foothill-De Anza Community College
College: De Anza
RFA Number: 96-0490

APPLICATION BUDGET DETAIL SHEET

Program Year: 1997-98, 1998-99
Source of Funds: Fresno City College Matching

Object of Expenditure	Classification	Amount
	1997-98	
2000	Clerical Support 10% * $30,000	3,000
3000	Benefits @ 20%	600
6000	Faculty Pentium Computer	2,000
TOTAL 1997-98		$5,600
	1998-99	
2000	Clerical Support 10% * $30,000	3,000
3000	Benefits @ 20%	600
TOTAL 1998-99		$3,600
	Total Direct Cost	9,200
	Total Indirect Costs (4% of line 8) *See specific RF*	
	Total Program Cost	$9,200

APPENDIX C

Information Systems Staffing Issues

EXTRACT FROM CAUSE ANNUAL ID SURVEY
COMPARISON OF RATIO OF PCs TO COMPUTING STAFF IN INSTITUTIONS WITH SIMILAR FTES

Institution Name	ST	FTES	Total RCs/Workstations	Total Computing Staff	Ratio of PCs to computing staff
Kent State University	OH	16,709	1,612	72	22
Ball State University	IN	16,688	5,800	77	75
Bowling Green State University	OH	16,500	2,630	104	25
Seneca College of Applied Arts & Tech	ON	16,500	3,948	35	113
University of South Australia		16,200	3,290	62	53
University of Oregon	OR	16,074	12,305	76	162
University of Memphis	TN	15,875	2,798	78	36
Syracuse University	NY	15,306	6,442	144	45
Southeastern Louisiana University	LA	15,125	3,201	32	100
El Paso Community College	TX	15,066	2,993	91	33
Griffith University		15,000	0	36	0
Oakland Community College	MI	14,700	1,790	46	39
Middle Tennessee State University	TN	14,600	2,215	37	60
University of Louisville	KY	14,496	11,619	15	775
British Columbia Inst of Technology	BC	14,400	2,298	49	47
University of Texas at San Antonio	TX	14,018	1,369	65	21
AVERAGES		15,654	4,019	63	68

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Comparison of FTES to Support Staff in Institutions of Similar Size

Institution Name	ST	FTES	TOTAL SUPPORT STAFF
Kent State University	OH	16709	72
Ball State University	IN	16688	77
Bowling Green State University	OH	16500	104
Seneca College of Applied Arts & Tech	ON	16500	35
University of South Australia		16200	62
University of Oregon	OR	16,074	76
University of Memphis	TN	15875	77.5
Syracuse University	NY	15306	144
Southeastern Louisiana University	LA	15125	32
El Paso Community College	TX	15066	91
Griffith University		15000	36
Oakland Community College	MI	14700	46.2
Middle Tennessee State University	TN	14600	36.8
University of Louisville	KY	14496	15
British Columbia Inst of Technology	BC	14400	49
University of Texas at San Antonio	TX	14018	65.35

SELECTED DATA FROM CAUSE 1996 INSTITUTIONAL SURVEY

(Data is from reported numbers of Academic, Administrative, Network and Telecom Staff for 327 CAUSE colleges and universities who responded to the annual survey in 1996.)

AVERAGE **FTES TO SUPPORT STAFF RATIO** FOR ALL 327 COLLEGES AND UNIVERSITIES= **274**

SANTA MONICA **FTES TO SUPPORT STAFF** RATIO= **540**

AVERAGE SUPPORT STAFF FOR THE 16 COLLEGES IN 14K-16K FTES = **64**

SANTA MONICA SUPPORT STAFF= **28**

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DATA COMM CLICK HERE LAB TESTS

Data Communications on the web
Business Case

December 1996

By David Cappuccio, Gartner Group Inc

Know The Types: Sizing up Support Staffs

One of the questions corporate networkers like to ask concerns LAN support staffing. Specifically, they want to know how many people are needed and what their skill set should be. The answer? It depends. It depends on a number of key factors, from the technical sophistication of users to the number of applications that are being run to whether the network is centralized or decentralized. It depends on whether or not there are service-level agreements with departments, and on what service levels need to be met. In short, there's no simple answer to the question.

The first thing corporate networkers should keep in mind is that cutting support staff will actually increase costs. Sounds odd until you think about unqualified end-users tackling complicated problems themselves.

Does this mean it's time to devise a complicated formula for figuring out how much bigger the staff should be? Not exactly. Instead, corporations might want to look at their end-user and server environments in terms of technical sophistication--and then develop staffing plans around each user or server type. Just break them into easy-to-remember categories according to technical implementation or utilization--such as Type A, B, and C.

End-Users and Abusers

Take a look at the Type A users first. They're the ones continually pushing the leading edge of technology--so-called power users like traders, systems developers or engineers, and, for lack of a better word, geeks. They require (or desire) the newest and fastest systems.

Contrary to popular belief, sup-porting these kinds of users is tough. They're technologically sophisticated and handle most problems themselves--so that when they do go to the help desk it's usually with a problem that's truly bizarre and difficult to isolate, duplicate, and resolve. Diagnostic and resolution times are high, affecting the levels of service given to other clients and forcing down the overall ratio of technical staff to end-users. At the companies we've surveyed that have Type A end-users, support ratios of 1-to-30 are about average.

Type B's are users--not abusers--of technology. They typically have a common suite of applications on their desktops; use servers for database, decision support, and workgroup applications (e.g., Notes); and, in many cases, have access to department-specific applications, intranets, and the Internet. They're skilled at their jobs and generally view technology as a means to an end.

And as such, they don't engage in the kind of peer support that Type A users do. Service-level agreement response times are critical for these users, since any time lost to technology problems could mean lost business. Companies that want to keep their Type B's happy generally have a

staffer-to-user ratio of between 1-to-60 and 1-to-100.

The typical Type C user is a general office worker with a desktop system installed, a standardized suite of applications, access to file and print servers, and in most cases, access to some host-based legacy applications. These customers are the easiest to support, at least after the initial introduction to technology. Ratios of 1-to-125 are common.

Serve Somebody

Figuring out support requirements doesn't end with categorizing the users. The ratios addressed above are for support staffs performing Tier 1 or desktop support functions. Tier 1 personnel are business-focused and concentrate on end-user desktop and applications support. They normally can solve up to 85 percent of the day-to-day problems without having to call on their technological superiors--the Tier 2 personnel.

Assuming that Tier 1 workers take care of what they're supposed to, Tier 2 staff can concentrate on technical work, and a similar metric can be developed for this group. Instead of focusing on end-users, this support staff should focus on network infrastructure. Consequently, the target ratio is no longer staff member per user, but servers per staff member.

Levels of labor

Use the same ranking scheme that we used above for categorizing users. In this case, traditional file and print services can be categorized as Type C's; they're the simplest to support, with ratios of 20 to 1 not uncommon.

This ratio changes with the introduction of higher-level directories and automation tools. Application and Web servers require support that's a bit more focused, and ratios are typically 12 to 1. While a Web server looks and feels like a file-and-print server, the ongoing maintenance of Web pages (and all of the associated links) is labor-intensive right now. Once complete sets of Web management tools become available, these servers could drop to Type C status.

Finally, there are the database servers. These are considered Type A; they generally require the most ongoing support.

The bottom line is that the most cost-effective and high-performance support organizations are those that make sure to focus on business solutions first (yes, we support end-users, not technology), and therefore position the most appropriate staff members at the right functional levels. Network engineering experts don't staff help desks, and PC support people don't handle network operating systems.

Once this repositioning occurs, and once well-defined job descriptions with the appropriate salary levels are laid out, the overall cost of support will begin to stabilize. Notice I didn't say that costs will all of a sudden start coming down. But at least we can begin to add more desktop and network functionality without adding significantly to support staffs.

David Cappuccio is vice president of the Network Computing Service at Gartner Group Inc. (Stamford, Conn.).

CAUSE Current Issues

Retaining, Retraining, and Recruiting Information Technology Staff

Our colleges and universities depend on effective use of information technology for instruction, research, and administration. With high demand for technology professionals, it is critical that we continue to recruit, retain, and retrain competent staff. Recruiting challenges include reduced numbers of graduates in computer-related fields, lack of competitive salaries in the higher education environment, and increasing market demand for information technology skills. The continuing explosion of technological change also forces existing staff to continually upgrade their technical skills. As the demand for information technology professionals continues to exceed the supply, our institutions will face even greater staffing challenges. Key issues we will need to discuss, if not resolve, in the next few years include these:

- How can we make our salaries more competitive with the industry? What non-salary benefits can we offer and promote?
- How can we promote our institution as a good place to work? What changes can we make to our environment, both physical facilities and culture, to make it more appealing to existing staff and recruits?
- What other tools can we use for recruitment and retention incentives?
- How can we improve our recruitment processes to enable us to respond more quickly to the changing market demands for information technology professionals?
- Are there better ways for titling/classifying staff? How can we restructure our compensation systems to be more skill- and performance-based?
- What staff development/training programs are needed to adequately keep existing staff abreast of technological change and develop their professional skills?
- How do we put together trainee programs that work? With whom should we partner?
- How can we hire our own graduates before the outside industries hire them?

Campus Reports / Web Sites

http://www.georgetown.edu/technology/taskforce/
See the Team 5 Report of the Human Resources Subcommittee of Georgetown University's Information Services and Computing Task Force, which addresses the challenges of grading and base pay among IT professionals at the University.

http://it-psa.ucdavis.edu/pages/human/empdev3.html
UC Davis's Information Technology Department's Employee Development Program

http://www.cause.org/information-resources/ir-library/text/cem9426.txt and
http://www.cause.org/information-resources/ir-library/abstracts/cem9723.html
Two articles that describe the California State University's efforts to change job design and compensation strategies in the IT community

http://www.cause.org/information-resources/ir-library/text/cnc9643.txt
A CAUSE 96 presentation about the University of Michigan's MSCALES approach, which utilizes a broadbanding position classification strategy and a skills-based compensation program.

Other Articles, Papers, Reports

http://www.cause.org/information-resources/ir-library/subjects/personnel-issues.html
A list of articles, papers, and documents in the CAUSE Information Resources Library that relate to personnel issues.

http://nwcet.bcc.ctc.edu/skills/example/example.htm
A Web site that descibes the book, *Building a Foundation for Tomorrow: Skill Standards for Information Technology,* developed by the NorthWest Center for Emerging Technologies, an excellent resource that identifies skill standards for information technology career clusters, including database administrator associate, IS operator/analyst, interactive digital media specialist, network specialist, programmer/analyst, software engineer, technical support representative, and technical writer.

http://www.cause.org/conference/c97/tracks/cnc9713-ppt/index.htm
A slide presentation from CAUSE97 by Susan Jurow, CUPA Executive Director, on human resources management practices that make a difference.

http://www.cause.org/conference/cause96/ci/cnc96ci03.txt
Summary of a Current Issues Session at CAUSE96 on IT staffing issues

http://www.cause.org/conference/c97/ci-3rs.html
Summary of a Current Issues Session at CAUSE97 on Retaining, Recruiting, and Retraining IT Staff

http://www.cio.com/archive/indexfront.html
CIO Magazine's article archive, which provides access to back issues--click on January 1, 1998, to access an issue that was devoted to IS staffing issues

http://www.ta.doc.gov/reports/itsw/itsw.pdf
An Acrobat file of *America's New Deficit: The Shortage of Information Technology Workers,* published by the U. S. Department of Commerce

Useful Web Sites:

http://www.techworkforce.org/
The High Tech Workforce Resource Center of the Information Technology Association of America (ITAA) provides information on initiatives to deal with the shortage of IT workers

http://www.cio.com/forums/staffing/
CIO Magazine's IS Staffing Resource Center provides links to job sites--where CIOs can post openings and search résumés--as well as surveys, articles on retention and recruiting strategies, and upcoming conferences of interest

http://www.cupa.org/
The College and University Personnel Association **(CUPA)**, which serves more than 6,400 human resources administrators at nearly 1,700 colleges and universities worldwide, conducts an annual administrative compensation survey, including IT staffing positions.

http://jobsmart.org/tools/salary/sal-comp.htm
JobSmart Home, California Job Search Guide, provides links to many Computer & Engineering Salary Surveys

Miscellaneous:

http://www.scottburbank.co.uk/serv04.htm

A "fact sheet" on staff retention developed by Scott Burbank Ltd.

http://www.wentworth.co.uk/html/reskilling_for_the_information_age.HTML
A brief summary of Wentworth Research Ltd.'s report, *A Reskilling for the Information Age*

http://www.dealconsulting.com/solutions/hiring.html
How to Improve Your Hiring Results, by Jack Deal, Deal Consulting

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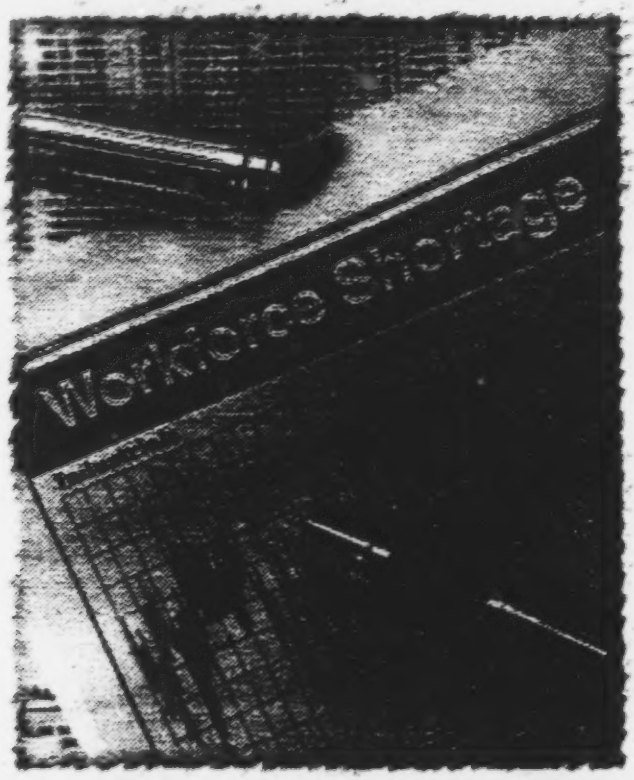
Feedback Search Home

America's New Deficit: The Shortage of Information Technology Workers



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I. INTRODUCTION

The sweep of digital technologies and the transformation to a knowledge-based economy have created robust demand for workers highly skilled in the use of information technology. In the past ten years alone, employment in the U.S. computer and software industries has almost tripled. The demand for workers who can create, apply and use information technology goes beyond these industries, cutting across manufacturing and services, transportation, health care, education and government.

Having led the world into the Information Age, there is substantial evidence that the United States is having trouble keeping up with the demand for new information technology workers. A recent survey of mid- and large-size U.S. companies by the Information Technology Association of America (ITAA) concluded that there are about 190,000 unfilled information technology (IT) jobs in the United States today due to a shortage of qualified workers.[1] In another study, conducted by Coopers and Lybrand, nearly half the CEOs of America's fastest growing companies reported that they had inadequate numbers of information technology workers to staff their operations.[2]

Evidence suggests that job growth in information technology fields now exceeds the production of talent. Between 1994 and 2005, more than a million new computer scientists and engineers, systems analysts, and computer programmers will be required in the United States-an average of 95,000 per year [Figure 1]. One difficulty is that the formal, four-year education system is producing a small proportion of the workers required. Only 24,553 U.S. students earned bachelor's degrees in computer and information sciences in 1994. While many IT workers acquire the needed skills through less formal training paths, it is difficult to determine whether such training can be adequately expanded to meet the demand for IT skills.

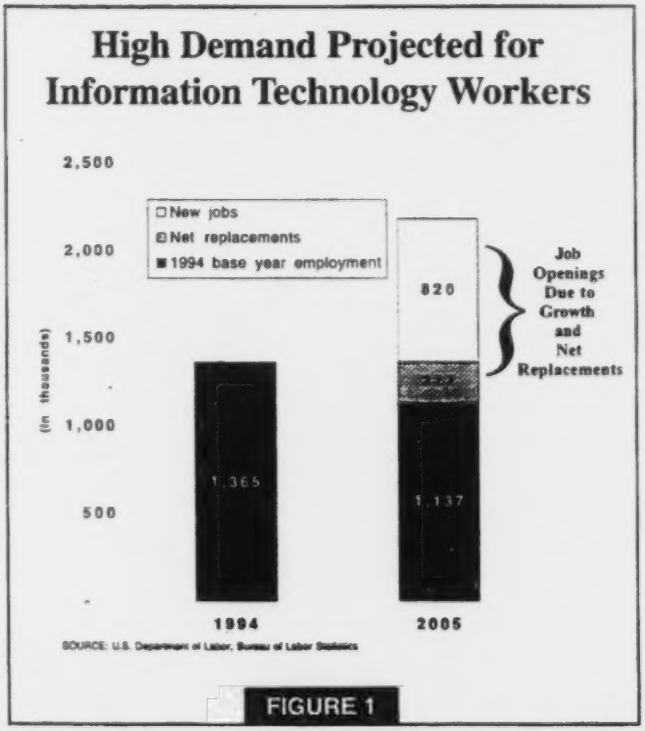

FIGURE 1

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This shortage of IT workers is not confined within the borders of the United States. Other studies, including work by the Stanford Computer Industry Project, document that there is a world wide shortage of IT workers. That industries in other nations are facing similar problems exacerbates the U.S. problem since the geographic location of such workers is of decreasing importance to the conduct of the work. U.S. employers will face tough competition from employers around the world in a tight global IT labor pool. Thus, the United States cannot expect to meet its long-term needs through increased immigration or foreign outsourcing, and must rely on retaining and updating the skills of today's IT workers as well as educating and training new ones.

Since information technology is an enabling technology that affects the entire economy, our failure to meet the growing demand for IT professionals could have severe consequences for America's competitiveness, economic growth, and job creation.

This paper is an initial effort to explore this complex and evolving challenge. It begins by considering the different ways in which interested parties have defined the challenge, and reviewing the various ways of defining the IT worker. It considers the state of supply and demand for IT workers and assesses the potential consequences of a failure to meet the country's need for these workers. To lay the foundation for further development of policy responses to this challenge, the paper also highlights some of the measures that companies are taking to meet their short-term and long-term needs for IT workers. Examples of partnerships between industry, government, and educational institutions are also provided with the hope of encouraging improved interactions among concerned groups. In exploring these issues, the paper recognizes that information technology is evolving rapidly, with resulting shifts in labor requirements. Accordingly, this paper is, at best, a snapshot of a rapidly changing phenomenon.

Statistical and Definitional Problems

What is an IT worker? It depends on whom you ask. In a broad sense, the term "information worker" can be applied to data entry personnel, auto mechanics who use computer diagnostic equipment, medical technicians who operate CAT scan equipment, and loan officers who use computers to assess creditworthiness, as well computer programmers, systems analysts, and computer scientists and engineers.

In the context of this report, we present data from several organizations that have looked at the IT worker shortage issue. Each defines an "information technology worker" differently. The following definitions are presented to provide a foundation for understanding the meaning behind the data.

For its study, the ITAA defined "information technology" as the "study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware," and considered the lack of skilled workers available to perform all functions related to its definition.

Others are engaged in the development of software who are not trained software professionals, but who are considered to be IT workers. Stanford University, for example, has observed that those developing software embedded in cars, cellular phones, aircraft, and consumer electronics were far more likely to be mechanical engineers or electrical engineers with minimal training in software development methodology.[3]

A study by the United States International Trade Commission of the competitiveness of the U.S. computer software and services industries referred to only those individuals who have software-related skills that fall into five general categories. These categories are applications software developers, systems software developers, systems integration service providers, outsourcing service providers, and custom programming service providers.[4]

For this report, the Office of Technology Policy analyzed Bureau of Labor Statistics data to determine projected growth rates of core information technology occupations through the year 2005. BLS classifies these occupations as computer scientists and engineers, systems analysts, and computer programmers.

Descriptions of Information Technology Worker Professions

Computer Scientists

Computer scientists generally design computers and conduct research to improve their design or use, and develop and adapt principles for applying computers to new uses. They are distinguished from other computer professionals by the higher level of theoretical expertise and innovation they apply to complex problems and the creation or application of new technology. Computer scientists employed by academic institutions work in areas ranging from theory, to hardware, to language design. Some work on multidisciplinary projects, such as developing and advancing uses for virtual reality. Computer scientists in private industry work in areas such as applying theory, developing specialized languages, or designing programming tools, knowledge-based systems, or computer games.

Computer Engineers

Computer engineers work with the hardware and software aspects of systems design and development. Computer engineers may often work as part of a team that designs new computing devices or computer-related equipment. Software engineers design and develop both packaged and systems software.

Systems Analysts

Systems analysts (SAs) use their knowledge and skills in a problem solving capacity, implementing the means for computer technology to meet the individual needs of an organization. They study business, scientific, or engineering data processing problems and design new solutions using computers. This process may include planning and developing new computer systems or devising ways to apply existing systems to operations still completed manually or by some less efficient method. SAs may design entirely new systems, including both hardware and software, or add a single new software application to harness more of the computer's power. They work to help an organization realize the maximum benefit from its investment in equipment, personnel, and business processes.

Computer Programmers

Computer programmers (CPs) write and maintain the detailed instructions, called "programs" or "software," that list in logical order the steps that computers must execute to perform their functions. In many large organizations, CPs follow descriptions prepared by SAs who have studied the task that the computer systems is going to perform. The transition from a mainframe to a primarily PC-based environment has blurred the once rigid distinction between the programmer and the user. Increasingly adept users are taking over many of the tasks previously performed by CPs. A growing number of sophisticated software packages allow users and SAs to write programs.

Source: Bureau of Labor Statistics, U.S. Department of Labor

II. THE DEMAND FOR WORKERS IN THE INFORMATION TECHNOLOGY-DRIVEN ECONOMY

The Office of Technology Policy analyzed Bureau of Labor Statistics' growth projections for the three core occupational classifications of IT workers—computer scientists and engineers, systems analysts, and computer programmers—to assess future U.S. demand. BLS projections for occupational growth are given in three bands-low, moderate, and high. The following analysis uses the moderate growth figures.

BLS projections indicate that between 1994 and 2005, the United States will require more than one million new IT workers in these three occupations to fill newly created jobs (820,000) and to replace workers who are leaving these fields (227,000) as a result of retirement, change of professions, or other reasons.

Of the three occupations, the largest job growth is accounted for by systems analysts, which are projected to increase from 483,000 in 1994 to 928,000 in 2005, a 92 percent jump. This compares to a projected increase of 14.5 percent for all occupations. The number of computer engineers and scientists is expected to grow by 90 percent, from 345,000 to 655,000 over the same period, while the number of computer programmer positions is expected to grow at a much slower 12 percent rate, from 537,000 in 1994 to 601,000 in 2005. However, while only 65,000 new computer programmer jobs are projected to be created during this period, 163,000 new programmers will be required to replace those exiting the occupation [Figure 2].

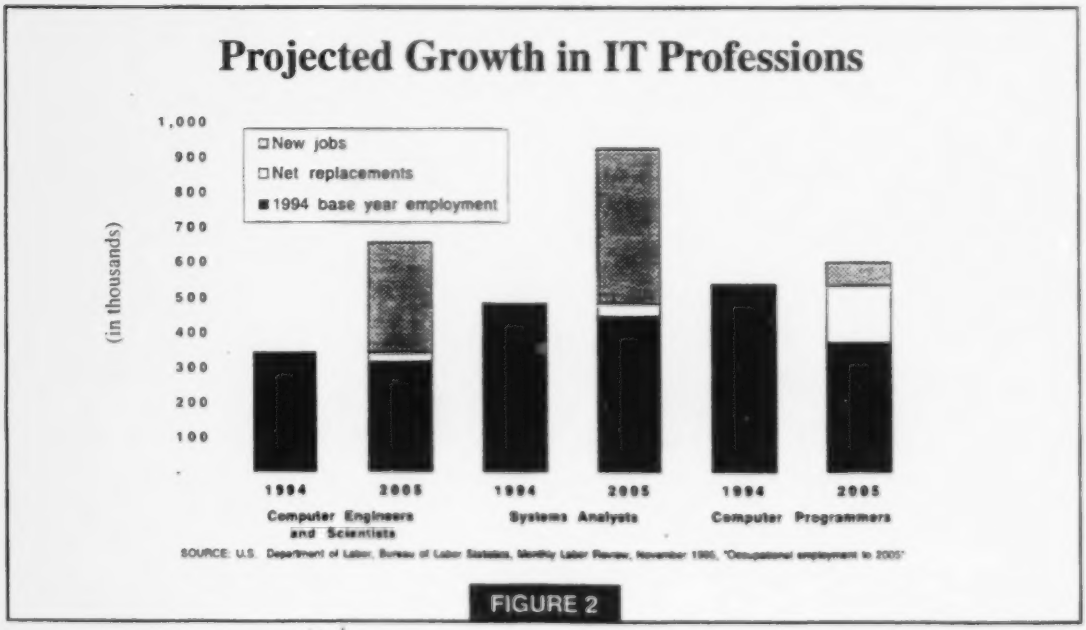

FIGURE 2

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The service sector (not including transportation, communications, finance, insurance, real estate, and wholesale and retail trade) is expected to absorb the lion's share of all increases in these core information technology occupations. By 2005, the service sector is expected to increase its employment of computer scientists and engineers by 142 percent, systems analysts by 158 percent, and computer programmers by 37 percent. In contrast, the number of computer scientists and engineers and systems analysts in the manufacturing sector is expected to grow much more slowly (approximately 26 percent and 48 percent, respectively), while the number of computer programmers is expected to decrease by about 26 percent.

Rapid technological change and the growing complexity of information technologies and their applications are accelerating the trend toward outsourcing some computer-related

Industry IT Worker Intensity*

	1994	%		2005 Projection	%
1	Computer and data processing services	33.46	1	Computer and data processing services	43.65
2	Computer and office equipment	14.76	2	Computer and office equipment	18.31
3	Telegraph and communication services, nec	10.03	3	Telegraph and communication services, nec	13.62
4	Guided missiles, space vehicles, and parts	6.13	4	Search and navigation equipment	8.00
5	Life insurance	6.13	5	Life insurance	7.96
6	Medical service and health insurance	6.11	6	Security & commodity exchanges & svcs.	7.70
7	Security & commodity exchanges & svcs.	5.80	7	Guided missiles, space vehicles, and parts	7.57
8	Search and navigation equipment	5.45	8	Medical service and health insurance	7.52
9	Research and testing services	5.33	9	Banking and closely related functions, nec	6.81
10	Banking and closely related functions, nec	5.27	10	Communications equipment	6.53
11	Communications equipment	4.75	11	Research and testing services	6.48
12	Management and public relations	4.62	12	Aircraft and parts	6.10
13	Aircraft and parts	4.27	13	Management and public relations	5.99
14	Fire, marine and casualty insurance	4.26	14	Fire, marine and casualty insurance	5.51
15	Electronic components and accessories	3.84	15	Electronic components and accessories	5.20
16	Engineering and architectural services	3.47	16	Federal government	5.08
17	Federal government	3.32	17	Engineering and architectural services	4.78
18	Crude petroleum, natural gas, & gas liquids	3.19	18	Crude petroleum, natural gas, & gas liquids	4.35
19	Measuring and controlling devices	3.16	19	Measuring and controlling devices	4.10
20	Federal and business credit institutions	3.15	20	Drugs	4.03
21	Drugs	2.95	21	Federal and business credit institutions	3.88
22	Security and commodity brokers and dealers	2.88	22	Holding and other investment offices	3.78
23	Services, nec	2.87	23	Services, nec	3.40
24	Holding and other investment offices	2.86	24	Telephone communications	3.33
25	Pension funds and insurance, nec	2.69	25	Security and commodity brokers and dealers	3.31

* Percent of industry workers that are computer scientists and engineers, systems analysts, and computer programmers.

nec = not elsewhere classified

SOURCE: Bureau of Labor Statistics, U.S. Department of Labor

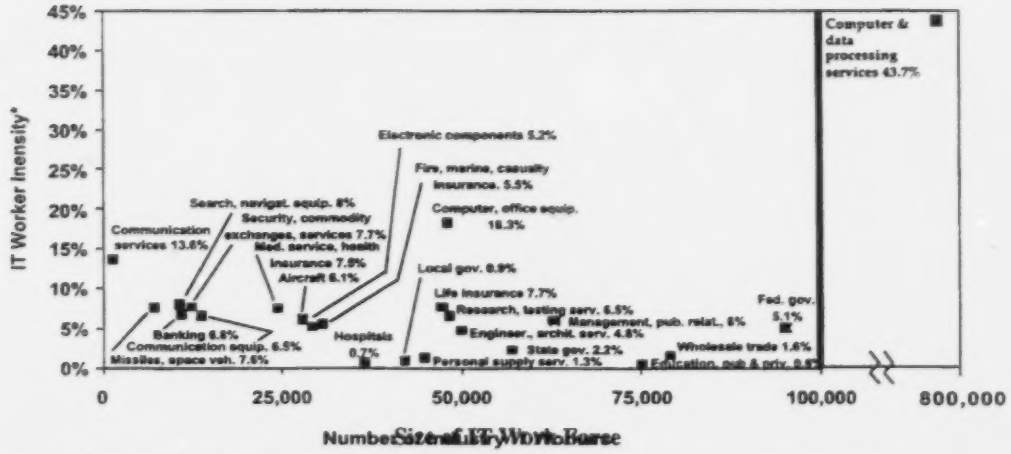
FIGURE 3

functions. Companies recognize the need to rely on outside experts to keep up with the technologies and to assemble multidisciplinary teams to meet the unique needs of each company. This is contributing to the growth of IT workers in services.

Certain industries are more IT worker intensive than others and thus, would be more severely affected by serious shortages of these workers [Figure 3]. And these industries are only growing in their IT worker intensity. In the most IT worker intensive industry—computer and data processing services—it is projected that, by 2005, 43 percent of the industry's employees will be computer programmers, systems analysts, and computer scientists and engineers.

However, IT worker intensity does not tell the whole story. The size of an industry's IT work force is an important consideration. For example, while the Federal government is projected to be less IT worker-intensive in 2005 than many other industries, the sheer size of its IT work force would make shortages of computer programmers, systems analysts, and computer scientists and engineers a troubling problem. When IT worker intensity and size of IT work force are taken together, a picture emerges as to which industries' competitive performance would be most adversely affected by severe IT worker shortages [Figure 4]. The computer and data processing services industry stands out starkly as an industry with much at stake in the supply of IT workers.

Projected IT Intensity and Size of IT Work Force for Selected Industries in 2005



* "IT worker intensity" is the percentage of a given industry's workers that are computer programmers, system analysts, and computer scientists and engineers.
Source: U.S. Department of Labor, Bureau of Labor Statistics, Moderate Projection.

FIGURE 4

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The Growing Importance of the Computer and Data Processing Services Industry

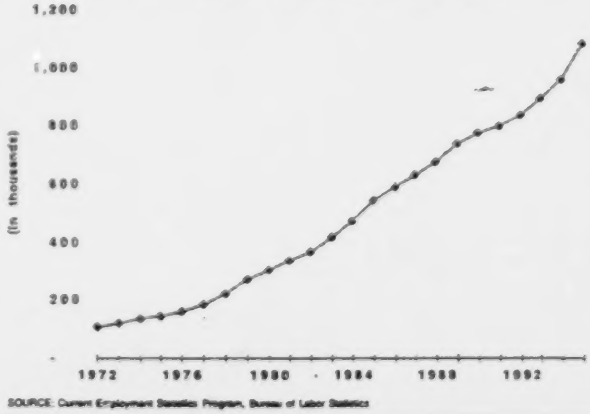
The size and influence of the computer and data processing services (CDPS) industry have expanded rapidly over the past decade. Between 1988 and 1995, CDPS sales grew 14 percent in constant dollars, compared to only 4 percent for all industries that conduct research and development.

Along with its phenomenal sales growth, CDPS employment has grown rapidly since the mid-1970s, as shown below. This growth is fueled not only by the rapid diffusion of information technologies throughout the economy, but also by the tendency of firms in all industries increasingly to outsource both routine and complex information activities in order to concentrate on the core business. Accordingly, increasing numbers of CDPS and management consulting firms are providing clients specialized information technology services more rapidly and less expensively than if the contracting firm did it themselves.

The shift to an information-based economy and the increasing concentration of information functions in information service firms is reflected in projected employment trends for "core" IT workers in the industry. By 2005, BLS projects that computer programmers, systems analysts, and computer scientists and engineers will constitute 43.7 percent of all 1.61 million CDPS workers (up from 0.95 million in 1994). Between 1994 and 2005, the CDPS share of total U.S. industry IT workers is expected to move up substantially with the computer programmer share rising from 30 to 41 percent, the share of systems analysts moving up from 20 to 29 percent, and the share of computer scientists and engineers increasing from 24 to 34 percent. Engineering and management services and personal supply services also increase their share of these workers, while most other services and all other major sectors of the economy (in particular manufacturing) decrease their shares.

As a consequence, the CDPS has, by far, the greatest stake in the adequacy of the supply of IT workers. Continuation of employment growth to a projected 1.6 million workers in 2005, with 702,862 "core" information technology workers, depends critically upon the existence of a well trained workforce. As U.S. industry increasingly depends upon the CDPS to provide many specialized information services, any adverse effects resulting from serious bottlenecks in the supply of new IT workers would reverberate across the economy.

Employment in Computer Services Has Grown Rapidly Since 1972



SOURCE: Current Employment Statistics Program, Bureau of Labor Statistics

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The Millennium Problem

Many computer professionals have been diverted to correct the so-called Year 2000 problem. Some of the most important computer software used in industry and government may not work correctly starting in the year 2000 because it can only recognize two-digit dates that represent the year. For example, 97 is recognized as 1997. This means that these computers may not recognize a change to the new century and, thus, generate erroneous data in a wide range of computer activities, such as financial transactions, logistics, production, and communications. Many of the computers involved are older mainframe computers, which has placed a premium on computer professionals skilled in the older computer language of COBOL. It has been estimated by the Gartner Group that it may cost as much as $600 billion worldwide to fix the problem.

Rapid Growth Expected for Systems Analysts

With an expected growth rate of 92 percent to the year 2005, systems analysts are among the most dynamic of occupations, working at the nexus of rapid change in technology and business organization. Composed largely of young workers, unlike computer programmers, only a small percentage of systems analysts are expected to exit the occupation by the year 2005.

Responsible for matching computer/information systems to the special needs of companies and systems, many systems analysts must not only have an understanding of information technologies, but also business, scientific, manufacturing, or engineering problems. According to BLS, for jobs in the business environment, employers usually want systems analysts with backgrounds in business management or closely related fields. Many information service and consulting firms are looking for educated, computer savvy, individuals with a variety of college and graduate degrees to fill systems analyst positions. A number of consulting firms, which are rapidly expanding their information services, prefer hires with degrees in management, business, public policy, etc., over those with more narrow computer specialization. These firms provide whatever additional training is necessary to fill out computer/systems skills. With a wide variety of skilled IT workers to draw upon, information service firms can quickly assemble the precise teams necessary to meet the needs of their diverse clientele.

The projected dramatic growth in systems analysts contrasts sharply with the expected net growth in computer programmers. Systems analysts may contribute to this slow growth as they assume more and more computer programming responsibilities, aided by the introduction of a variety of programming software which simplify and extend the programming process. Some additional factors may further slow the growth in computer programmers. These include economies of scale associated with increased outsourcing of information functions and increased reliance by organizations on prepackaged software rather than wholly customized data systems; overseas outsourcing of computer programming; and the focus on enterprise-wide system integration which is consolidating stand-alone computer systems and islands of automation.

III. IS THERE AN ADEQUATE SUPPLY OF IT WORKERS?

Current statistical frameworks and mechanisms for measuring labor supply do not allow for precise identification of IT workers shortages. However, evidence does suggest a problem may be emerging.

Upward Pressure on Salaries

The strongest evidence that a shortage exists is upward pressure on salaries. The competition for skilled IT workers has contributed to substantial salary increases in many IT professions. A compensation survey conducted by William M. Mercer showed that average hourly compensation for operating systems/software architects and consultants rose nearly 20 percent from 1995 to 1996. A survey conducted by the Deloitte & Touche Consulting Group revealed that salaries for computer network professionals rose an average of 7.4 percent from 1996 to 1997. Computerworld's annual survey found that in 11 of 26 positions tracked, average salaries increased more than 10 percent from 1996 to 1997. For example, systems analysts' salaries were up 15 percent, programmer/analysts' salaries were up 11 percent, and directors of systems development received an average increase of 10 percent. Starting salaries for graduates with bachelor's degrees in computer science have nudged up to an average of $36,666[5], while experienced programmers can command salaries ranging from $45,000 - $75,000.[6]

ITAA Survey

A recent survey of mid- and large-size companies, both information technology-related and non-information technology-related, conducted by the Information Technology Association of America found approximately 190,000 unfilled information technology jobs in the United States due to a shortage of qualified workers. According to this survey, shortages are likely to worsen. ITAA found that 82 percent of the information technology companies responding to the survey expect to increase their IT staffing in the coming year, while more than half of the non-information technology companies planned IT staff increases.

The Education Pipeline for IT Workers

Over the last ten years, there has been a decline in the number of students receiving university degrees in computer science. These graduates come from four-year degree-granting universities which focus on computer theory; that is, operating systems, languages, distributed systems, computer architecture and compilers. According to the U.S. Department of Education, the number of bachelor-level computer science degrees awarded by U.S. universities declined more than 40 percent between 1986 and 1994, from 42,195 to 24,553 [Figure 5].[7] The

significant decline in bachelor-level computer science degrees is, however, an imperfect indicator of declining labor supply, given that many IT workers acquire their skills through alternative education and training paths.

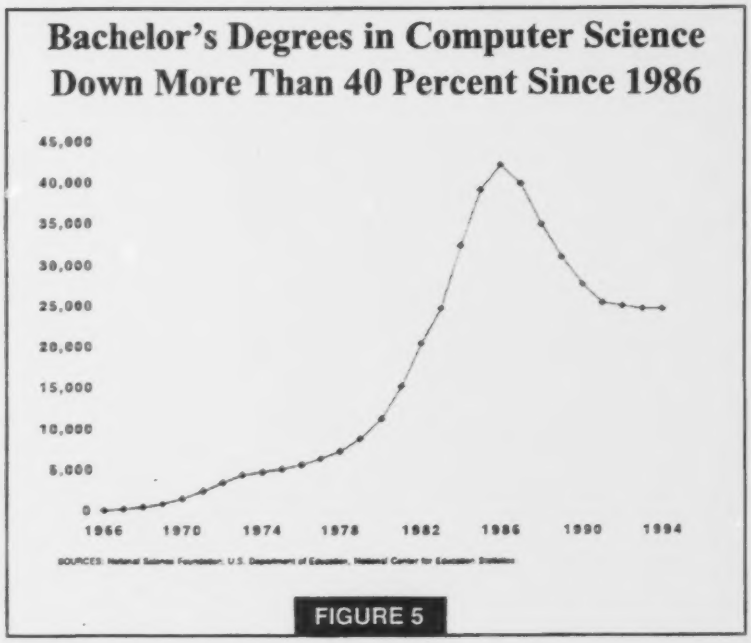

FIGURE 5

While there have been some increases in the award of computer science masters and doctoral degrees, overall computer science degrees awarded have dropped from a high of 50,000 in 1986 to 36,000 in 1994 [Figure 6].

In addition, foreign students make up a significant share of U.S. computer science graduates. Of the 36,000 individuals awarded graduate and undergraduate computer science degrees in 1994, about 18 percent were foreign nationals. For advanced degrees, the proportion of foreign nationals increases, reaching more than 50 percent for doctorates.[8] The Computer Research Association estimates that foreign nationals comprise nearly 50 percent of computer engineering students in the United States.[9] The high proportion of foreign nationals in the graduate population would indicate that American industry cannot count on capturing all new graduates.[10]

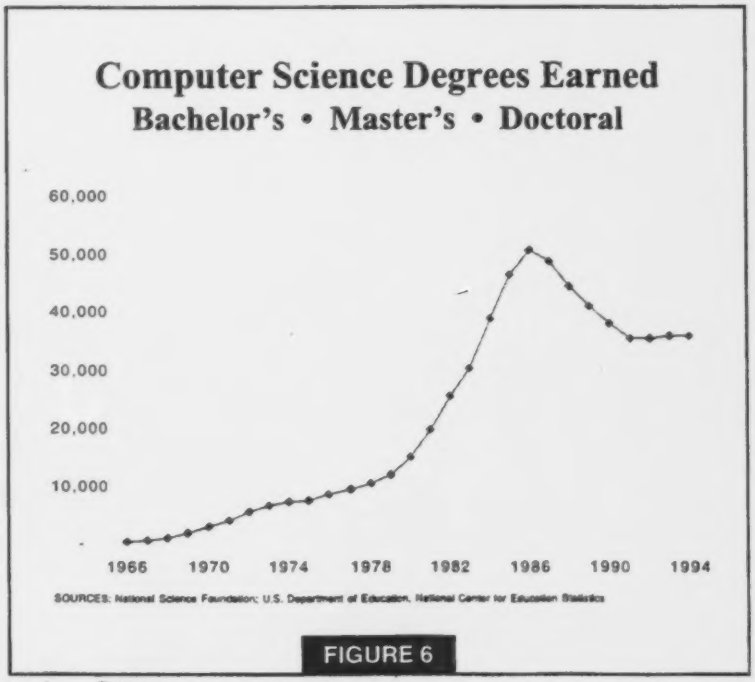

FIGURE 6

IT workers also obtain their skills from training providers other than four-

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Training, Other Qualifications, and Advancement

Computer Programmers

There are no universal training requirements for programmers because employers' needs are so varied. Computer applications have become so widespread that computer programming is taught at most public and private vocational schools, community and junior colleges, and universities. Although some programmers obtain two-year degrees or certificates, bachelor's degrees are now commonly required. In the absence of a degree, substantial specialized experience or expertise may be needed.

The majority of programmers hold a four-year degree. Of these, some hold a B.A. or B.S. in computer science or information systems while others have taken special courses in computer programming to supplement their study in fields such as accounting, inventory control, or other business areas. College graduates who are interested in changing careers or developing an area of expertise may return to a junior college or technical school for more training.

Employers using computers for scientific or engineering applications prefer college graduates who have degrees in computer or information science, mathematics, engineering, or the physical sciences. Graduate degrees are required for some jobs. Employers who use computers for business applications prefer to hire people who have had college courses in management information systems (MIS) and business, and who possess strong programming skills. Knowledge of FORTRAN, COBOL, C, Fourth Generation Languages (4GL), CASE tools, systems programming, C++, Smalltalk, and other object oriented programming languages is highly desirable. General business skills and experience related to the operations of the firm are preferred by employers as well.

Most systems programmers hold a four-year degree in computer science. Extensive knowledge of a variety of operating systems is essential. This includes being able to configure the operating system to work with different types of hardware, and adapting the operating system to best meet the needs of the particular organization. They also must be able to work with database systems such as DB2, Oracle, or Sybase.

(continued on next page)

Training, Other Qualifications, and Advancement—continued

Computer Scientists and Engineers, and Systems Analysts

There is no universally accepted way to prepare for a job as a computer professional because employers' preferences depend on the work to be done. Prior work experience is very important. Many people develop advanced computer skills in other occupations in which they work extensively with computers and then transfer into computer occupations. For example, an accountant may become a systems analyst specializing in accounting systems development, or an individual may move into a systems analyst job after working as a computer programmer.

Employers almost always seek college graduates for computer professional positions; for some of the more complex jobs, persons with graduate degrees are preferred. Generally, a Ph.D., or at least a master's degree in computer science or engineering, is required for computer scientist jobs in research laboratories or academic institutions. Some computer scientists are able to gain sufficient experience for this type of position with only a bachelor's degree, but this is difficult. Computer engineers generally require a bachelor's degree in computer engineering, electrical engineering, or math.

For systems analysts, many employers seek applicants who have a bachelor's degree in computer science, information science, computer information systems, or data processing. Regardless of college major, employers generally look for people who are familiar with programming languages and have broad knowledge of and experience with computer systems and technologies. Courses in computer programming or systems design offer good preparation for a job in this field. For jobs in a business environment, employers usually want systems analysts to have a background in business management or a closely related field, while a background in the physical sciences, applied mathematics, or engineering is preferred for work in scientifically oriented organizations.

Technological advances come so rapidly in the computer field that continuous study is necessary to keep skills up to date. Continuing education is usually offered by employers, hardware and software vendors, colleges and universities, or private training institutions. Additional training may come from professional development seminars offered by professional computing societies.

Source: Bureau of Labor Statistics, U.S. Department of Labor

year degree-granting universities. These include:

- two-year associate-degree-granting community colleges which provide grounding in applications (especially in new computer programs and hot areas such as "the year 2000 problem) as well as basic theory, and vocational technical education programs
- special university/community college one-year programs designed to upgrade the skills of IT workers already in the work force (new applications) or those with backgrounds in other technical fields who are looking for a fast track entry into the IT profession
- private-sector computer learning centers which typically offer courses to people with little or no computer background who are interested in discovering whether they have the aptitude to make it in the computer-related professions
- in-house company training to upgrade employee skills (e.g. client/server-based tools and architectures, C++ and Visual Basic) or to assist in the transition from one skill set (e.g. computer hardware engineers) to another (e.g. computer software engineers)
- computer user groups, Internet forums, and company-sponsored help sites also offer knowledge that can help expand or update computer skills

In addition to those earning four-year degrees in computer and information sciences, in 1994, 15,187 degrees and awards in computer and information sciences below the bachelors level were earned.

Offshore Sourcing and Recruiting

Some companies are drawing upon talent pools outside the United States to meet their demands for IT workers. India, with more than 200,000 programmers, in conjunction with predominantly U.S. partners, has developed into one of the world's largest exporters of software. In 1996-97, outsourced software development accounted for 41 percent of India's software exports. Companies are also searching for IT workers in foreign labor markets--in Russia, Eastern Europe, East Asia, and South Africa--using direct recruiting efforts, Internet techniques, and international recruiting agencies.[11]

The Global Shortage of IT Workers

As in the United States, data limitations make it difficult to assess and compare the supply and demand for IT workers in foreign countries. Nevertheless, executive surveys and anecdotal evidence suggest that IT workers are in increasingly short supply in other countries as well.

A survey of some 1,500 chief information officers (CIOs) in 21 countries, conducted by Deloitte and Touche Consulting Group, suggests that IT managers throughout the world are experiencing a difficult combination of unprecedented demand for IT workers and high turnover rates. According to the survey, companies are finding it especially difficult to retain employees in four key areas—client/server architecture, data modeling, distributed databases, and particular packaged software applications such as SAP. Turnover rates in these areas range from 35 to 45 percent.

In the advanced industrial economies, strong growth rates in the IT sector continue to propel demand for IT workers. Canada's IT sector has been growing by 10 percent annually; estimates of the shortfall in IT employees range from 20,000 to 30,000. Given Canada's proximity and relatively high level of integration with the United States, U.S. firms often can recruit Canadian IT workers by offering more generous compensation packages than are available locally. While Canadian universities have not experienced a sharp drop in computer science enrollment, the Canadian government has responded to the increased demand for IT workers through several channels: it established the Software Human Resources Council to help develop the IT workforce; improved immigration policies; and encouraged universities to augment standard degree programs with 3 to 9 month IT training programs.

In some developing economies, IT-based economic growth strategies, combined with other sources of demand for IT workers, may overwhelm the supply of skilled personnel. In India, for example, the software industry has been growing at over 40 percent per year. Exports account for approximately half of the industry's revenues, due in large part to the outsourcing activities of U.S.-based software companies. Given the country's skilled workforce, high quality standards, relatively low labor costs, widespread use of English, and available communication links, India is a particularly attractive outsourcing site for Western software companies. In addition, the Indian government has implemented a variety of programs and policies designed to expand the country's software industry, largely through Software Technology Parks of India (STPI).

Although various institutions are producing 55,000 students annually, India's highly skilled software professionals—numbering approximately 160,000 in 1996-1997—are not expected to keep pace with the country's rapidly growing software industry. The country's large software firms are attempting to solve the problem through internal training and education programs, combined with support from the country's universities, colleges, and private educational institutions. In addition, the industry's main trade association, the National Association of Software and Service Companies (NASSCOM), established the Institute of Computer Software Professionals of India (ICSPI) to assist with the problem.

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Global Shortage—continued

In other countries, local IT development strategies alone are creating a gap between the supply and demand for skilled IT professionals. Malaysia's long-term economic development strategy relies heavily on creating a "multimedia super corridor" (MSC),a 9 by 30 mile IT center that is expected to lead the country to a new level of economic and technological development. Through tax breaks and other investment-related incentives, the Malaysian government is actively seeking to attract foreign IT firms. However, these efforts may outstrip the supply of skilled personnel: Malaysia's universities are producing less than 6,000 IT engineers per year, far fewer than the estimated annual demand of 10,000. In addition, many skilled workers have been seeking higher wages in countries like Singapore. To address the problem, the Malaysian government has included a university within its MSC plan, is exploring university-industry partnerships to train workers outside of the college track, and is seeking to reduce any barriers to hiring foreign workers. Indeed, comparative economic developing studies suggest the importance of education, training, and skill flexibility for countries, like Malaysia, that are pursuing IT-based economic development trajectories.

Sources:

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IV. COMPETITIVENESS ISSUES

Information technologies are the most important enabling technologies in the economy today. They affect every sector and industry in the United States, in terms of digitally-based products, services, and production and work processes. Thus, severe shortages of workers who can apply and use information technologies could undermine U.S. innovation, productivity, and competitiveness in world markets.

Productivity and the Cost of Doing Business

Competitive pressures have driven businesses to adopt a wide range of computer systems to improve productivity, manage production, improve both internal and external communications and to offer customers new services. Private sector investment in enterprise-wide applications alone was estimated to be $42 billion in 1996.[12] The service sector, now representing 70 percent of U.S. GDP, is increasingly information technology intensive. Manufacturing also relies heavily on information technology from computer aided design and computer numerically controlled machine tools to computer-based systems for inventory control, production planning, and statistical process control. In short, computer-based information systems have become an indispensable part of managing information, workflow, and transactions in both the public and private sector. Therefore, a shortage of IT workers affects directly the ability to develop and implement systems that a wide variety of users need to enhance their performance and control costs. A recent survey by Deloitte & Touche Consulting reported that worker shortages are causing many companies to delay information technology projects.

As competition for IT workers heats up, rising salary levels increase the cost of doing business. For example, Electronic Data Systems Corp. (EDS) recently reported that IT worker shortages have contributed to pushing workers' compensation up by 15 to 20 percent annually. The company reported in April 1997 that it may reduce its work force by thousands to cut labor costs and maintain profits. Many computer companies faced with rising labor costs have passed those increases along to their customers. However, EDS and similar companies rely on long-term fixed contracts to develop and manage large computer systems and have less flexibility to pass increased costs to customers.[13]

Shortage-driven increases in salaries for both skilled IT managers and IT workers also increase the amount of venture capital investment required by start-up companies in information technology-related businesses. For example, new software technology start-ups—which have benefitted substantially from private venture capital and are IT worker-intensive—could require greater venture capital investment in the future to cover salary costs. These rising labor

costs could result in venture capital seeking growth opportunities elsewhere, constraining the emergence and growth of many promising new companies.

Government and non-profit organizations may increasingly be squeezed out of the competition for IT talent. For example, while average starting salaries for graduates with bachelor's degrees in computer engineering grew to more than $34,000 in 1995, the Federal government's entry level salary for computer professionals with bachelor's degrees ranged from about $18,700 to $23,200 that year. The Department of Defense is already having difficulty retaining IT employees; it appears industry is offering them more attractive compensation packages. The U.S. Air Force Communications Agency reports a loss rate of 42 to 45 percent of systems administrators from 1993-1995.

Industry Growth

High-tech industries, particularly leading-edge electronics and information technology industries, are driving economic growth not only in the United States but around the world. According to industry estimates, the markets for computer and communications hardware and services, and for software have grown to one trillion dollars.[14] With the current annual growth rate estimated at 10 percent, the global market for these products and services may be growing by $100 billion annually. These industries are IT worker intensive and shortages of critical skills would inhibit their performance and growth potential.

In the ITAA survey, 50 percent of the information technology company executives cited lack of skilled/trained workers as "the most significant barrier" to their companies' growth during the next year-a problem viewed as significantly greater than economic conditions, profitability, lack of capital investment, taxes, or regulation. An additional 20 percent of the IT company executives identified the shortage of these workers as "a barrier" to their companies' growth during the next year.

Innovation

The United States is a leader in the development of new products and services, and many important consumer and industrial innovations-from computers, consumer electronic products, and telecommunications services to automotive electronics, aerospace products, and advanced industrial systems-have been made possible by information technologies. Information technologies are expected to continue to form the basis of many of the most important products, services, and processes of the future. For example, it is expected that in less than a decade, electronics will account for about one-fifth of an automobile's value.[15] Shortages of IT workers could inhibit the nation's ability to develop leading-edge products and services, and raise their costs which, in turn, would reduce U.S. competitiveness and constrain economic growth.

Trade

The shortage of IT workers could undermine U.S. performance in global markets. The global market for computer software and computer services reached $277 billion in 1994. The United States is both the predominant supplier of and the primary consumer for these goods and services.[16] Ranked in terms of global market share in 1994, eight of the world's top ten applications software vendors and seven of the top ten systems software vendors are U.S. firms. Both of these markets are growing rapidly, with the computer software market growing 12 percent annually, and the computer services market growing 11 percent annually, reaching $420 billion by 1998, a 50 percent increase just between 1994 and 1998. Aerospace, another IT worker intensive industry is also a global market leader for the United States, and is the Nation's leading net exporter of manufactured goods. An adequate supply of IT workers is essential to America's continued strength in these markets.

High-Wage Jobs

A shortage of qualified IT workers could also prevent the United States from taking full advantage of high-wage job creation. Many information technology jobs are high-wage jobs. Workers in the software industry earn more than twice the national average. A William M. Mercer compensation study shows that the average hourly compensation in 1996 for an intermediate customer support technician was $40.80; software development architect, $77.70; operating systems software architect/consultant, $85.60, and operating systems/software programming analyst manager, $92.20. Even if shortages ease and upward pressure on salaries is reduced, the IT professions have traditionally been high-wage jobs.

V. FACTORS AFFECTING THE SUPPLY OF INFORMATION TECHNOLOGY WORKERS

A number of factors may contribute to constraints in the supply of IT workers with the skills employers want.

Underlying Causes of Decline in Computer and Information Sciences Degrees

A number of reasons have been offered for the declining number of U.S. students entering and earning degrees in computer and information sciences (a 42 percent decrease between 1986 and 1994):

- despite rapid gains in the last decade, only about half of all high school graduates complete algebra II or chemistry, which are prerequisites for college mathematics and science;[17]
- defense industry cutbacks and corporate downsizing have left many students with the impression that there are fewer job opportunities in the computer field;[18]
- many students believe that universities do not provide proper training for the marketplace, particularly with respect to understanding the software development process in an industrial setting;[19] and
- on-the-job training is increasingly substituting for formal four-year university education in computer science.[20]

It should be noted that computer science is not a particularly popular choice of academic study. Only 1.1 percent of women and 3.3 percent of men earning bachelor's degrees in 1994 earned them in computer science.

Mismatches between what universities teach and what industry needs

While workers with degrees from two- and four-year computer science programs are attractive to potential employers, many employers have found some skill sets lacking in many of these graduates. For example, graduates may be superb computer theorists, but employers are looking for IT workers skilled in networking/distributed computer environments and large software projects, who have real world experience, and who are capable in business and industrial settings.

Industry Practices and Expectations

Information technology is advancing rapidly, causing frequent changes in skill requirements. A decade ago, the Internet was a tool used mostly by researchers at American universities. Today the Internet and the World Wide Web are information tools for the masses, which

has driven up the demand for skills needed to create and support on-line information services.[21] According to one estimate, 760,000 persons are now working at Internet-related companies.[22]

Even within established segments of the software discipline, such as software programming, change is rapid. Software market leaders constantly update their programs used in a wide range of work place applications, causing employers to demand that new hires have the latest skills.[23]

A critical factor affecting the IT labor market is the volatility introduced into a company's work stream by the appearance of new versions of software products in shorter cycle times — in some cases every six months. Some have suggested that this rapid change in software leads companies to unrealistic expectations on potential hires, as well as on their own staff in terms of keeping their skills up-to-date.[24] Companies may advertise positions as requiring specific skills sets, even before training on the new software is generally available. They may also recruit on the basis of computer program-specific skills, rather than looking more broadly at applicants' basic understanding of computing concepts, experience with programming, and ability to learn new technologies.

In addition, businesses often define skill sets for IT jobs very narrowly-for example, skill in a specific programming language-but developers of computing technologies come from a wide variety of backgrounds, including electrical engineering and the humanities. Electrical engineers led the way in the development of computer graphics. Linguists and electrical engineers built the first machine translation and speech understanding and production systems.

The Need to Retrain Workers

Many of the unfilled IT jobs such as managerial positions, require specific skills and significant experience. Retraining existing employees could play an important role in meeting the growing skills needs of companies. Some suggest that companies play a larger role in cultivating and updating information technology skills among their employees.[25]

ITAA does note, and anecdotal evidence confirms, that most IT companies provide training to their IT employees.[26] However, highly trained workers can easily leave an employer after receiving extensive and expensive training and, in a tightening labor market, they frequently do. Nevertheless, while upgrading the skills of existing employees is important for companies seeking to meet their needs for skilled IT workers, employer provided training alone is unlikely to satisfy the increasing demand.[27]

Underrepresentation of Women and Minorities in the Computer Science Education Pipeline

Women and some minorities are underrepresented in the computer and information sciences education pipeline. Women—who comprise 51 percent of the population and earn more than half of all bachelor-level degrees awarded—earn about one-quarter of the bachelor-level computer and information sciences degrees awarded by U.S. academic institutions [Figure 7]. More disturbing is the trend line: the share of all computer science degrees awarded to women in the United States has fallen steadily from a peak of 35.8 percent in 1984, to only 27.5 percent in 1994—the lowest level since 1979 [Figure 8].[28] This trend, coupled with the dramatic downturn in the number of computer science degrees awarded, has cut the number of women receiving bachelor's degrees in computer science by more than half, from a high of 15,126 in 1986 to 7,020 in 1994. In 1994, men were three times more likely to choose computer science as a field of study than women.

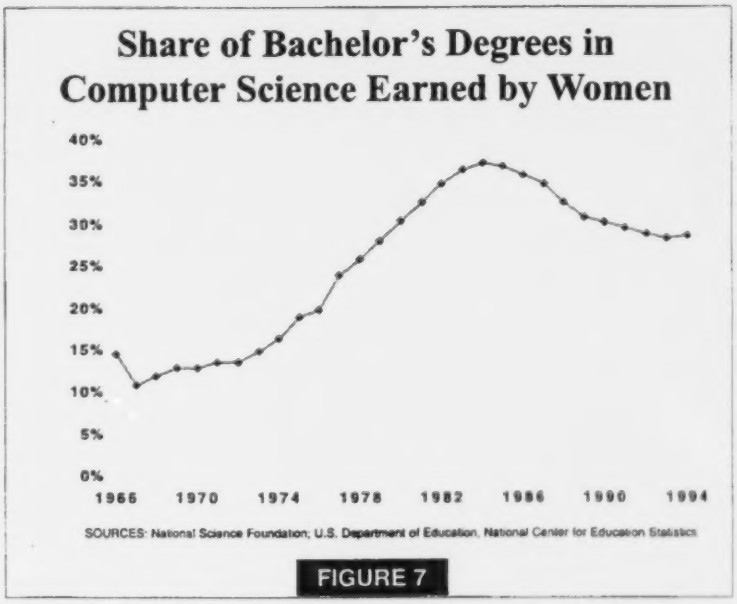

FIGURE 7

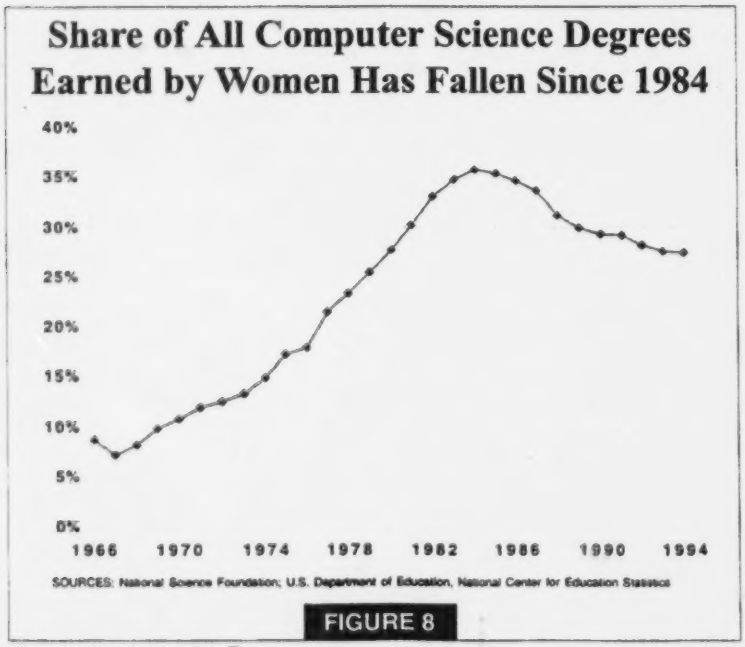

FIGURE 8

African-Americans, Native Americans and Hispanics are also underrepresented in computer science education [Figure 9], though the share of degrees in these fields received by each of these groups has climbed substantially since 1977. These groups also are underrepresented in higher

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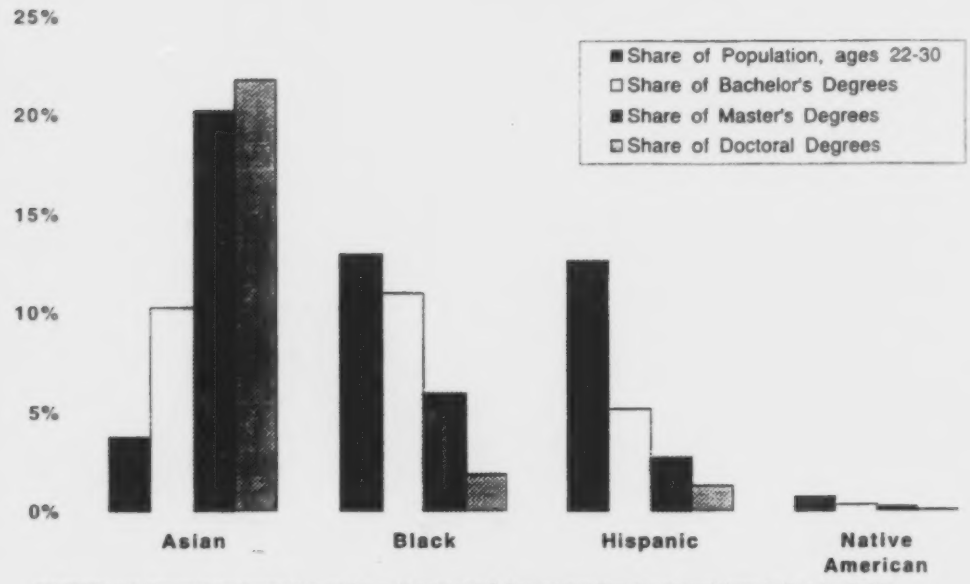
Distribution of Degrees in Computer Science by Race and Ethnic Heritage



SOURCES: U.S. Bureau of the Census; National Science Foundation; U.S. Department of Education, National Center for Education Statistics

FIGURE 9

education generally. Comparing the number of bachelor's, master's, and doctoral degrees granted in 1994 to students of each race and ethnic group to their share of the U.S. population of 22-30 year olds, we found the percentage earned by Whites (5.2 percent) and Asians (5.5 percent) to be significantly higher than Native Americans (2.9 percent), African-Americans (2.4 percent), and Hispanics (1.4 percent). Nevertheless, Asians, African-Americans, and Hispanics who earn bachelor's degrees choose computer science as a field of study at higher rates than White and Native American students [Figure 10].

Computer Science Selection Rate, by Race

	All Bachelor's Degrees	Bachelor's Degrees in Computer Science	Percent Choosing Computer Science
White	947,309	20,503	2.2%
Asian	51,463	3,592	7.0%
Black	77,872	2,773	3.6%
Hispanic	45,376	1,311	2.9%
Native American	5,671	97	1.7%

SOURCES: National Science Foundation; U.S. Department of Education, National Center for Education Statistics

FIGURE 10

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Efforts are underway in both the private and public sectors to increase women's and minorities' participation in technical fields. The National Science Foundation sponsors programs to encourage minorities and women to enter the fields of science and technology. Professional organizations also support such efforts. Members of the Association of Women in Computing, for example, participate in a National Science Foundation sponsored telementoring program aimed at encouraging young women to enter technical fields.

Limitations on Immigration of Skilled Workers

A number of U.S. companies have resorted to recruiting foreign nationals to fill skilled information technology jobs. Under the H-1B non-immigrant category of U.S. immigration law, 65,000 professional foreign workers may be sponsored by U.S. employers each year. These foreign workers must have a professional undergraduate degree or substantial work experience, and may work in the United States for six years.[29]

Some companies and industry representatives believe the current cap is too restrictive and have expressed concerns about proposals to make it more difficult or costly to recruit foreign workers. They say foreign nationals are needed to fill open IT jobs and, unless they can hire more foreign workers, they may move some of their operations to locations outside of the United States where labor markets are believed to be less tight.[30]

Some professional engineering societies believe the shortage of IT workers is exaggerated. They fear that easing visa restrictions would create an over supply of IT workers, which could eventually lead to layoffs. The Institute of Electrical and Electronics Engineers (IEEE) has questioned the IT industry's contention. IEEE suggests the shortage is a skills mismatch created by rapidly changing technology and the difficulty of keeping worker skills up-to-date to keep pace. IEEE advocates a focus on retraining the current work force, including engineers laid off in defense downsizing.[31]

Regardless of which view is correct, the emergence of a world-wide shortage of IT workers indicates that U.S. employers cannot rely on increased immigration or even outsourcing to foreign countries to meet any significant IT skill shortages. Instead, the United States—as well as other industrialized countries— will be forced to rely increasingly on policies and strategies directed at educating, training, and retraining their domestic work forces in IT skills.

VI. CURRENT RESPONSES TO THE SHORTAGE

Companies, universities and governments are taking steps to increase the U.S. supply of adequately trained IT workers. For example, Senator John Warner recently introduced a bill to establish a federal commission to recommend ways to increase the U.S. pool of IT workers.

Industry Responses

Since there has been no comprehensive, systematic survey of industry responses to the tightening IT labor market, much of the information on how U.S. industry has adapted to meet its needs is anecdotal. Based on this information, it appears that companies are pursuing aggressive recruitment strategies to fill their IT slots. This includes attracting top performers from other companies.[32] Others pay bonuses to their employees who provide hiring leads.[33] Still others attract employees with signing bonuses of $2,000-$3,000 or more.[34] Stock options in the signing package are becoming routine.[35] Other carrots designed to attract workers include flexible work hours, telecommuting, day care centers, and on-site health clubs. Companies are also expanding their recruiting to other parts of the world such as Russia, Eastern Europe, East Asia, and South Africa.[36]

Companies are also finding ways to overcome the decline in graduates with university computer science degrees. Some hire graduates from other academic disciplines and provide training in computer skills.[37] Similarly, other companies have found the practice of retraining existing staff to be sufficient in fulfilling their IT skill requirements. Many employees with no prior background and skills in computing are able to learn and apply new information technologies.

Companies are broadening their approach to recruiting from colleges and universities. Students at less prominent schools are sought out. Job offers are made as early as a year before graduation. Firms hope that student internships will pave the way to full-time employment, and provide future job candidates with real world experience.

Companies are tapping foreign pools of skilled labor, recruiting foreign nationals and outsourcing more work to contractors in other parts of the world.[38] Geographic location is an insignificant barrier since development of software products does not require that various members of the development team be in one location. By taking advantage of the Internet, electronic blackboard technologies, and videoconferencing, some companies are able to manage teams around the globe that collaborate on projects, sometimes around the clock.

Public Private Partnerships

Public-private partnerships have been forged to help ensure that more workers will be equipped with information technology-related skills. Most have focused on revamping the U.S. educational system to reflect the changing needs of industry. *Industry's Role in the Reform of Mathematics, Science and Technology Education* is one publication that resulted from such an effort by the Triangle Coalition for Science and Technology, a partnership among business, education, engineering, industry, and science and technology-related organizations that work both nationally and locally to improve science, mathematics, and technical education.[39] The ITAA has proposed that the current education paradigm be examined with an eye toward the knowledge-based economy, both by the education community and the employers of IT workers.[40]

There is some evidence that a new paradigm is emerging. For example, a committee composed of the Association of IS Professionals, the Association for Computing, and the Association for Information Systems developed an Information Systems (IS) model curriculum to enhance the ability of the U.S. educational system to meet the needs of employers. The curriculum is designed to equip students with a strong mix of computing, business, and communications skills, and includes classes on computer languages. It is being implemented by the University of Minnesota's Carlson School of Management.[41]

Similarly, companies are forming partnerships with community colleges to develop curricula that are more reflective of industry's needs, especially the need for information technology-related skills.[42] Also, community colleges are working closely with employers in retraining efforts for current employees. Broome Community College in upstate New York, for example, is working with local companies to provide appropriate training to upgrade the skills of the current work force.[43]

The Software Publishers Association has encouraged the principal stakeholders--Federal, state, and local governments, as well as the private and nonprofit sectors--to assume responsibility for producing a world-class, Information Age work force.[44] They advocate the reengineering of K-12 public education, a process that has already started. Many companies, driven by the need to ensure a talent pool from which to draw in the future, have formed strategic partnerships with the schools to improve science and mathematics education at the K-12 levels. Some companies are offering their own in-house expertise and resources to help teachers and students sharpen such skills. For example, in July of 1997, Boeing sponsored a Space Academy for Educators aimed at helping teachers inspire and motivate students in mathematics and science.[45] Since 1992, Boeing has also conducted a Discover Engineering Summer Science Camp in which several hundred children take part in "hands-on" science, mathematics and engineering workshops taught by Boeing engineers.[46]

Professional organizations are also involved in supporting science and technology education in the schools. Since 1979, the New York Academy of Sciences' Education Department has worked to enrich and improve mathematics, science and technology education in New York City. The American Association for the Advancement of Science (AAAS) sponsors a grassroots program, called Project 2061, designed to improve science education programs in American schools. This project has developed books, CD-ROMs, and on-line tools to assist teachers in making all high school graduates science literate.[47]

Regional Cooperation

Regional cooperation is also being forged to address IT worker shortages in certain geographic areas. In the metropolitan Washington, D.C. area, representatives of regional business groups, area universities and the technology councils of Northern Virginia, suburban Maryland, and Baltimore are establishing an alliance to address the area's shortage of workers with information technology skills.[48]

Federal Initiatives to Raise the Technical Skills of the American Work Force

Technology has fundamentally changed the skills Americans need to flourish in the world of work. For example, most work places rely heavily on computer and telecommunications technologies. The Clinton Administration has promoted policies and programs to help prepare today's and tomorrow's work force for a technology-intensive, 21st century economy.

Mathematics and Science Education. Technical skills are built on a foundation of mathematics and science education that begins in a student's early years. The Goals 2000 Educate American Act of 1994—designed to raise U.S. students' competencies—set an ambitious national goal: "U.S. students will be first in the world in science and mathematics achievement." While much of the responsibility for achieving this goal rests with school systems at the state and local levels, the Federal government plays a role in encouraging improvements. Federal investments for improvements in mathematics and science education at the pre K-12 education levels focus on enhancing teacher skills, improving science and mathematics curricula, promoting system reforms, and other areas.

The Federal government also works as a catalyst to inject new vitality into U.S. undergraduate science, mathematics, engineering, and technology education by investing in organizational reform, faculty enhancement, curriculum improvement programs, and student support. The Federal government is also a major supporter of graduate education, financing fellowships and traineeships in pre- and post-doctoral programs. Federal research grants also support graduate students by providing funds for assistantships.

Opening the Doors to College. Over half of the new jobs created in the last three years require higher-level skills and training beyond what a high school diploma affords. To help prepare Americans for such jobs, the President set a goal of making two years of college—the 13th and 14th years of education—as universal for young Americans as the first 12 are today. To support this goal, the President initiated a strategy to make college more accessible and affordable. With Hope Scholarships, for students in the first two years of college, most taxpayers will be eligible for a tax credit equal to 100 percent of the first $1,000 of tuition and fees and 50 percent of the second $1,000. With the Lifetime Learning Credit, for those beyond the first two years of college or taking classes part-time to upgrade their job skills, most families will receive a 20 percent tax credit for the first $5,000 of tuition and fees through 2002, and for the first $10,000 thereafter.

School-to-Work Opportunities. The School to Work Opportunities Initiative is serving as the catalyst for the creation of state and local systems to better prepare all students for college and careers. School-to-Work funding is being used to create systems that integrate academic and vocational learning, expose students to a range of career possibilities, expand opportunities for students to engage in internships or other work experiences, and forge links between high schools and post-secondary education institutions.

(continued on next page)

Federal Initiatives—continued

Technological Literacy. Today, technological literacy—the ability to use computers and other technology to improve learning, productivity, and performance—is a new basic that our students must master. Yet, American schools are not prepared for the technological era. About half of all teachers have little or no experience with technology in the classroom. Only 4 percent of schools have a computer for every five students—a ratio that allows regular use by each student. Only 9 percent of classrooms have connections to the Internet.

In 1995, President Clinton challenged the Nation's parents, teachers, and government, community, and business leaders to work together to ensure that all children in American are technologically literate by the dawn of the 21st century. Four goals guide the technology literacy agenda:

1. Connect every school and classroom in America to the information superhighway.
2. Provide access to modern computers for all teachers and students.
3. Develop effective and engaging software and on-line learning resources as an integral part of the school curriculum.
4. Provide all teachers the training and support they need to help students learn through computers and the information superhighway.

America's Technology Literacy Challenge: In his 1996 State of the Union Address, President Clinton asked Congress to fund a $2 billion, five-year Technology Literacy Challenge to catalyze state, local and private sector partnerships in each state to achieve the four educational technology goals. Congress supported the President's request for first-year funding and appropriated $200 million for grants to states to launch this challenge.

The Technology Innovation Challenge Grants: This component of the technology literacy challenge invites school systems, colleges, universities, and private businesses to form partnerships to development creative new ways to use technology for learning. Each Federal dollar is matched by more than 3 to 1 by local and private funds.

Universal and Affordable Access to Advanced Telecommunications: The Telecommunications Act of 1996 states that schools and libraries should have affordable access to telecommunications services for educational purposes. In May 1997, the Federal Communications Commission released a Report and Order on Universal Service which makes most elementary and secondary schools eligible for discounts ranging from 20 to 90 percent on all commercially available telecommunications services, Internet access, and internal connections.

TIIAP: The U.S. Department of Commerce's Telecommunications and Information Infrastructure Assistant Program is merit-based and provides matching grants to nonprofit organizations such as schools and libraries. The grants are used to purchase equipment for connection to networks, including computers, video conference systems, network routers, and telephones; to buy software for organizing and processing information; to train staff, users, and others in the use of equipment and software; and to purchase Internet access.

VII. SUMMARY AND FURTHER ACTIONS

Just a few years ago, Java was coffee, C was a passing grade, and web masters had eight legs. Today, experts in Java computing and C programming command a premium in the labor market, and an army of human web masters keeps information updated on the rapidly expanding World Wide Web. The labor market for IT workers is expanding and shifting rapidly, driven by the unrelenting advancement and diffusion of information technology. New skills are constantly in demand, and IT occupations are evolving in new directions. As a result, employers are having difficulty obtaining the numbers of adequately trained IT workers they need.

The United States has much at stake in ensuring an adequate supply of IT workers; severe shortages would compromise organizational productivity and the Nation's ability to develop leading-edge products and services, as well as the growth and global competitiveness of important U.S. industries.

In a tight labor market, employers are resorting to a number of strategies to fulfill their IT skill needs, such as aggressive recruiting programs that include financial and quality of working life sweeteners, tapping foreign sources of labor, retraining existing staff in IT skills, and forming partnerships with the academic community to expand the pool of IT workers.

As the Office of Technology Policy worked to develop this snapshot of a rapidly moving situation, we found the information and data inadequate to completely characterize the dynamics of the IT labor market. For example, information is lacking on the supply of IT workers flowing from employer provided training and from academic programs other than computer and information sciences, both believed to be important training grounds for the U.S. IT work force.

Improving our understanding of one of the country's most critical labor markets is an important goal for the United States. Accurate and timely information is essential for the efficient functioning of labor markets-for potential employees who need to know where the jobs are and what skills are needed, for employers who need to identify and recruit highly trained workers, and for the educators and trainers who are responsible for work force development.

A Need for Better Indicators and Statistics

Better information about where computer and information science graduates go, what kind of jobs they find, and what skills they need in those jobs would help educators do a better job of curriculum development and career counseling, and provide students with a roadmap for plotting their educational and career paths.[49] The report, *Leading, Concurrent, or Lagging: The Knowledge Content of Computer Science in Higher Education and the Labor Market*, released by the U.S. Department of Education and the National Institute for Science Education in May of 1997, is a step towards making such information widely known.

In addition, since information technology continues to play an ever increasing role in global competition and economic growth, there may be a need to develop new economic indicators that relate to the information technology-related production, capacity, and evolutionary stage of advanced and industrializing countries that would provide a new view of each country's current competitive position and potential.[50]

The Need for a Better Understanding of Linkages

More data is needed on linkages between engineering, science and technology education and training, and work place needs. The National Science Foundation recently published a report, based on surveys of technical education in two year colleges, which begins to document linkages between their programs and local businesses. Such analysis could be extended to four-year degree granting universities.

The Need To Better Understand the IT Training Industry

Many IT workers currently obtain their skills through a rapidly emerging IT training industry that has developed largely outside the formal educational system. More data is needed on the structure of this IT training industry, how it responds to rapidly changing technology, what the costs are to obtain significant IT skills, and whether workers interested in obtaining such training are able to obtain the financial assistance through existing student aid programs.

The Need For Stakeholder Partnerships

A number of stakeholders from industry and the academic community have begun to address the need to increase the supply of highly skilled IT workers. However, a broader range of public-private partnerships at both the national and regional levels may be needed to erase any long-term shortages of critical IT skills that would constrain business and organizational performance, the ability of Americans to fill high-wage jobs, and growth of the U.S. economy.

ENDNOTES

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[32] Bay Networks Inc., a Silicon Valley communications company, lost a five-year programmer making $80,000 to a consultancy offering two years guaranteed at $300,000 per year (Business Week, March 10, 1997).

[33] Charles Schwab Corp now pays employees a $3,000 finder's fee for referrals to technology applicants (Business Week, March 10, 1997).

[34] The Washington Post, June 3, 1996.

[35] Washington Business Journal, December 16, 1996.

[36] "Forget the Huddled Masses: Send Nerds,,, Business Week, July 21, 1997.

[37] The Washington Post, October 11, 1996.

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[39] *Industry's Role in the Reform of Mathematics, Science and Technology Education*. See the Triangle Coalition for Science and Technology Education homepage: http://www.triangle-coalition.org.

[40] Congressional Testimony (ITAA), April 24, 1997.

[41] Computerworld, June 16, 1997:1.

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[43] See a description of Broome Community College /Industry Partnerships: http://scholar.lib.vt.edu/ejournals/CATALYST/V23/N2/habel.html.

[44] "Toward An Educated Workforce: Transforming the Industrial Workforce Into an Information Workforce,,, The Software Publishers Association.

[45] See description of the Space Academy for Educators In Boeing's News Release section at http://www.boeing.com.

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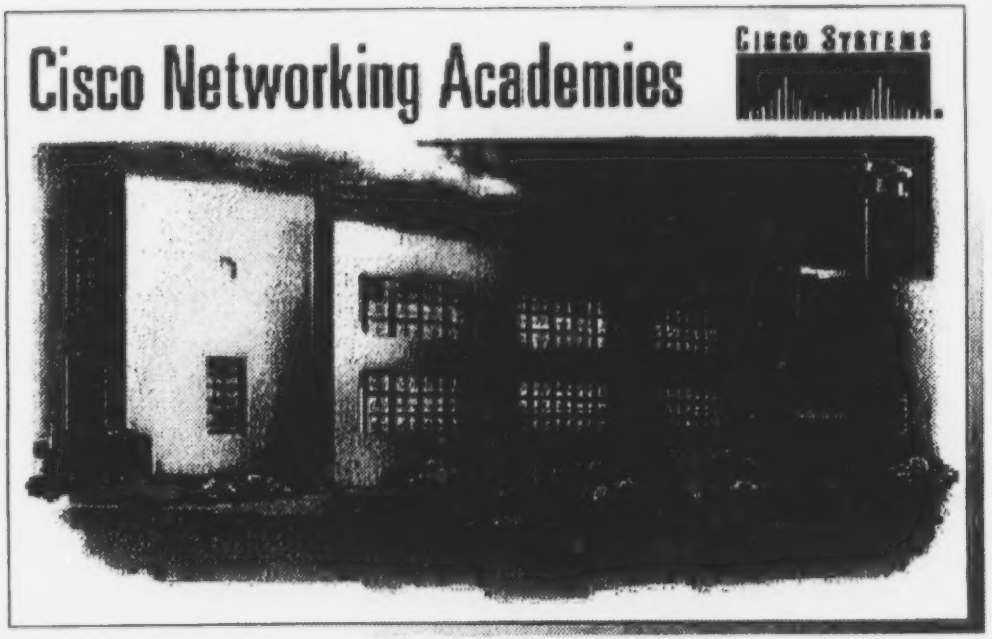
APPENDIX D

Industry Training Initiatives



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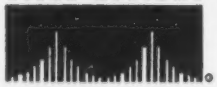
K-12 Technology and Education: A National Priority

"Every classroom in America must be connected to the information superhighway, with computers, good software, and well-trained teachers"

President Clinton

1996 State of the Union Address

CISCO SYSTEMS



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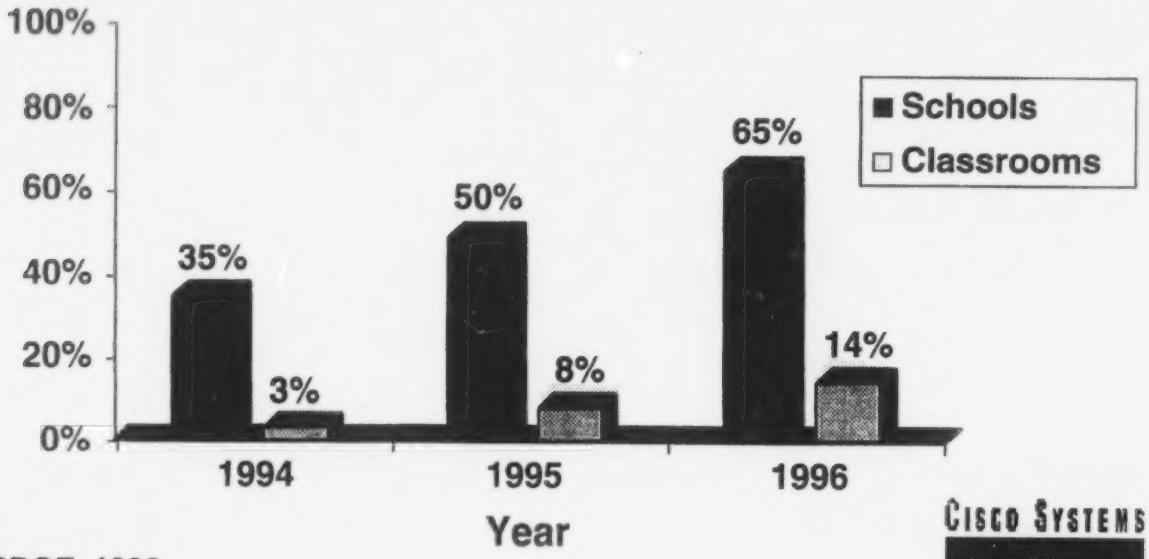
Most Classrooms Lack Internet Access

Percent of Public Schools and Classroom with Internet Access



Source: USDOE, 1996

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Cisco Systems

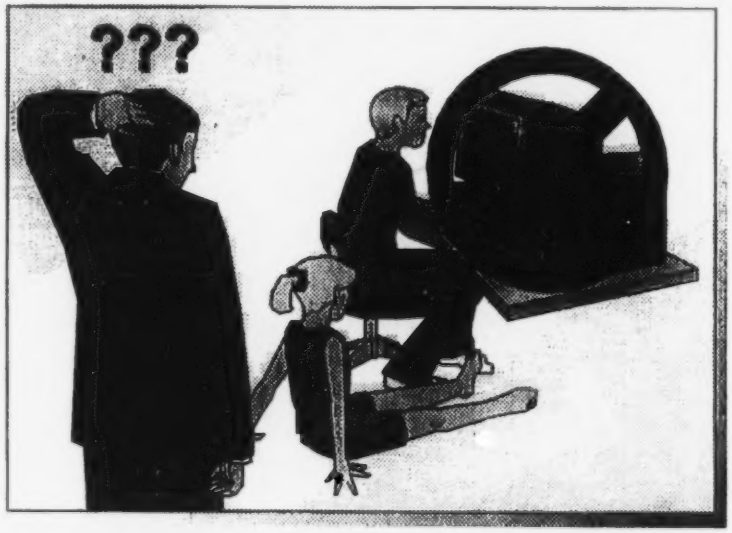
Help Wanted!

"There are now approximately 190,000 unfilled technology jobs in mid- to large-sized U.S. companies"

Information Technology Association of America Web Site, Citing their 2/97 Study "Help Wanted: the IT Workforce Gap at the Dawn of a New Century"

Problem Statement—Summary

- Schools don't have resources or time to design, build, and maintain networks
- Students are not receiving exposure to the benefits of networked technology
- The resulting shortage of skilled Information Technology workers is limiting corporate growth

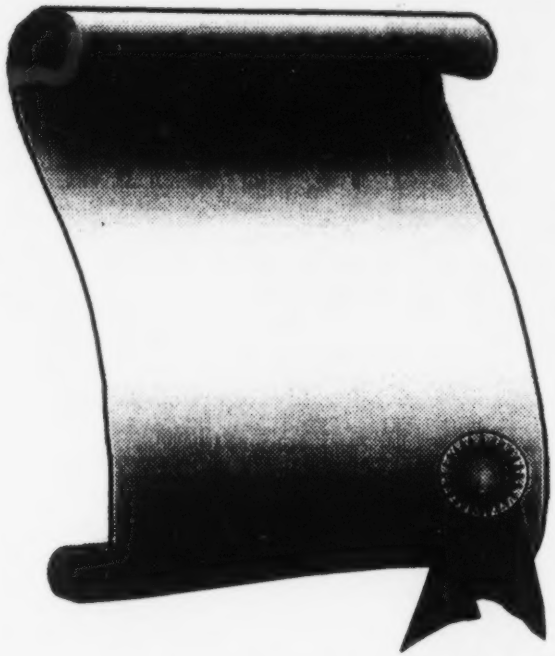


Cisco Networking Academies

- A program that trains and certifies students to design, build, and maintain networks
- A partnership between Cisco and schools, government, and industry

Partnership Benefits

- ***Students*** **get skills leading to employment opportunities in computer networking fields**
- ***Schools*** **get important new networking curricula and resources to help maintain their internal networks**
- ***Corporations*** **get trained and certified IT professionals**
- ***The government*** **gets support for its school-to-career and technology-in-the-classroom initiatives**



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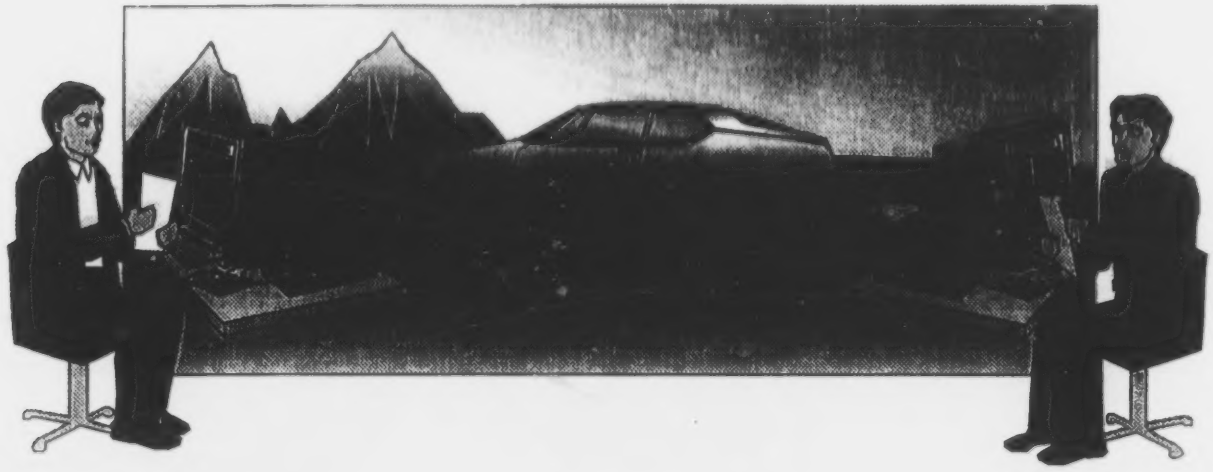
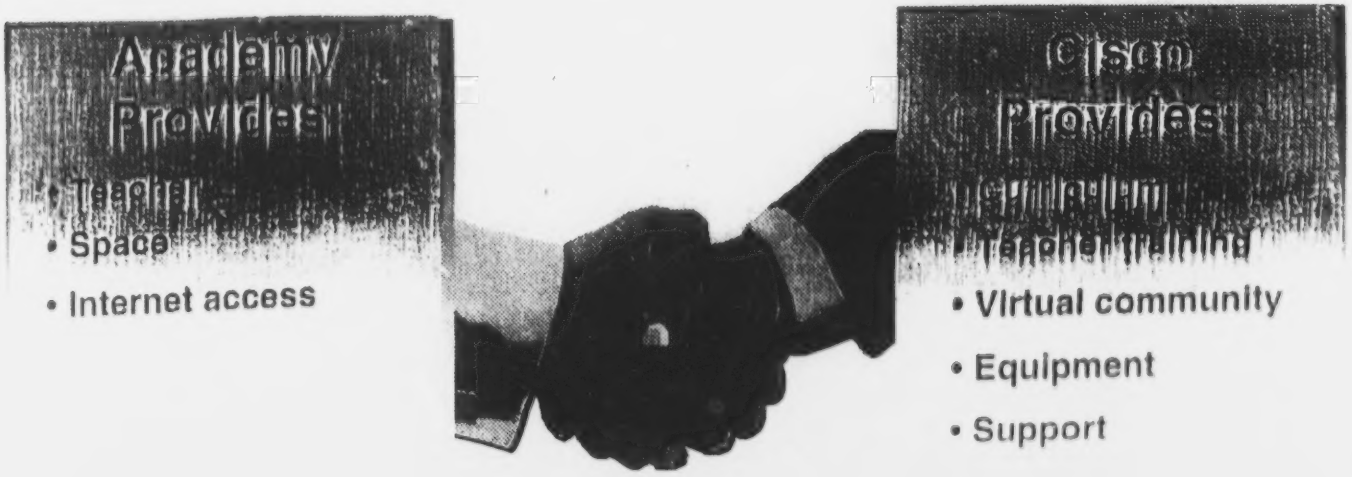
"The Shop of the 21st Century"

- "Auto Shop" and similar classes taught vocational skills in the 20th century
- Vocational skills for the 21st century revolve around computer and networking technologies



How Does the Program Work?



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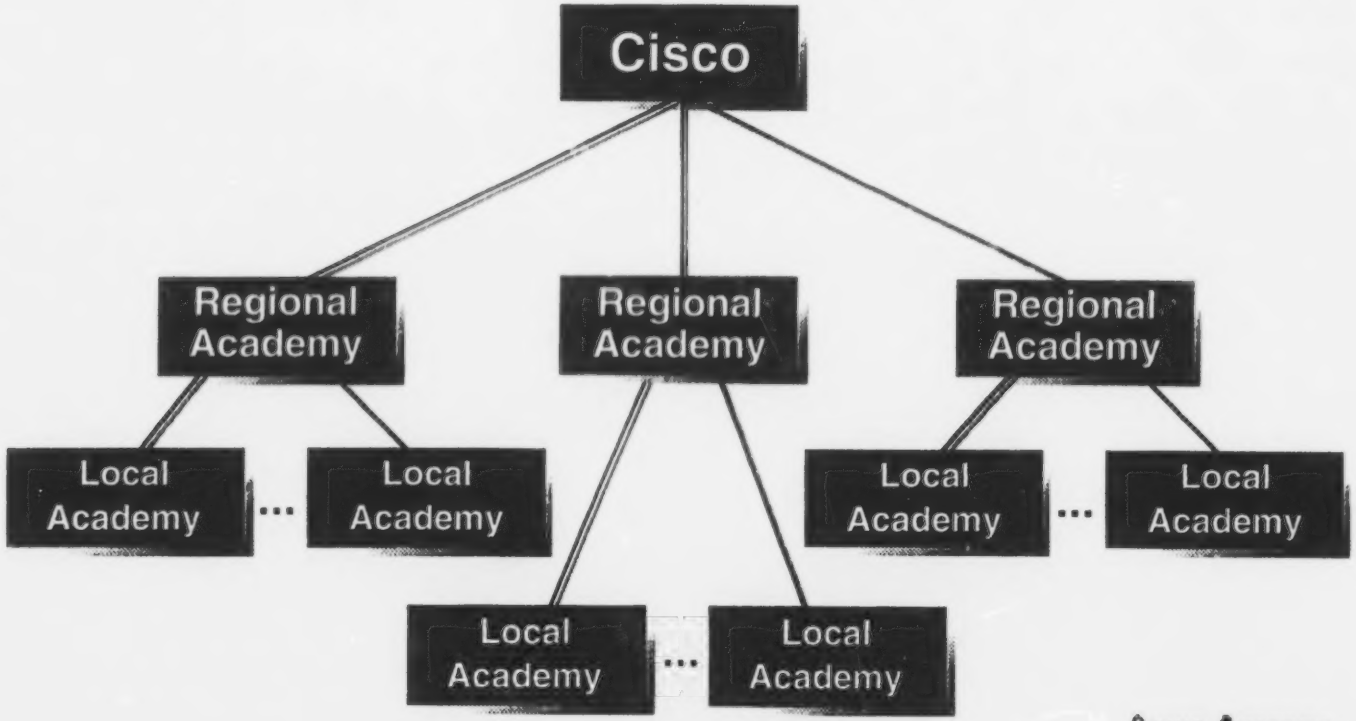
Program Hierarchy



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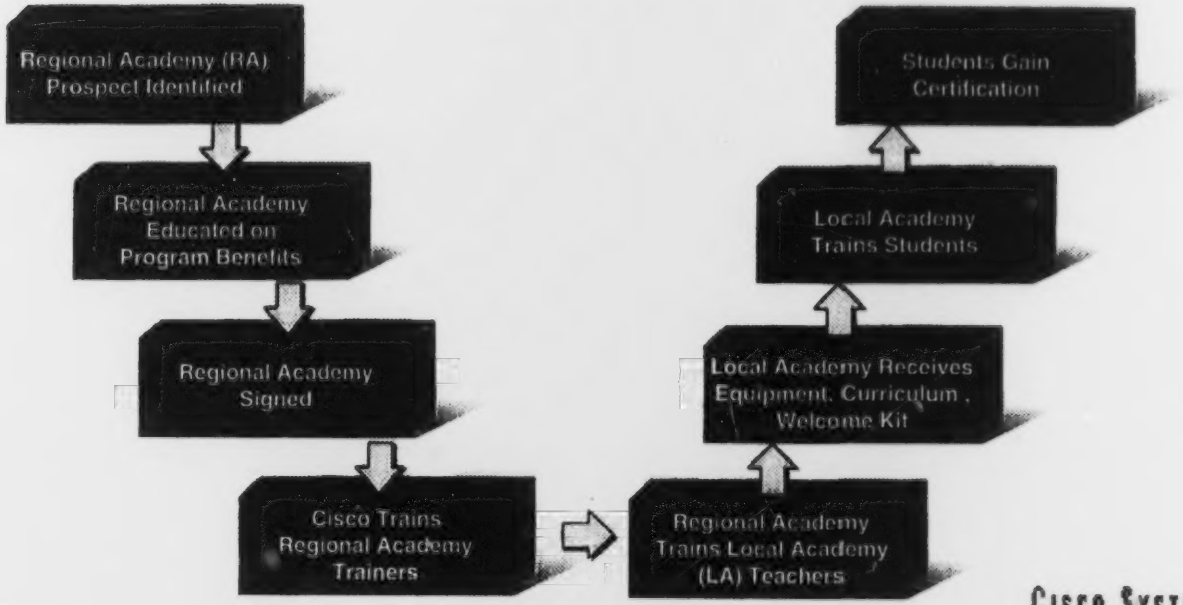
Cisco Networking Academies

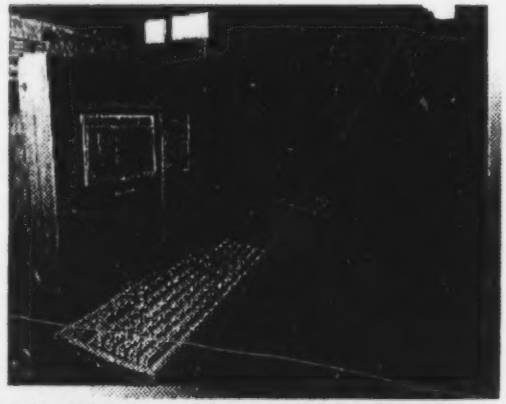
Implementation Overview


Regional Academy (RA) Prospect Identified
Regional Academy Educated on Program Benefits
Regional Academy Signed
Cisco Trains Regional Academy Trainers
Regional Academy Trains Local Academy (LA) Teachers
Local Academy Receives Equipment, Curriculum, Welcome Kit
Local Academy Trains Students
Students Gain Certification

CISCO SYSTEMS

Cisco Networking Academies Curriculum

- 4 semesters, 70 hours each
- Targets high school and college students
- Pedagogically sound
- Learn by doing
- Multimedia instruction
- Cisco Certified Networking Associate exam



Katie Wright, a 16-year-old junior at New Hanover High School in Wilmington, N.C., logs on to Cisco System's Networking Academy. Photo by Rick McKay/AA-S.

Cisco Systems

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First Semester Curriculum

Networking Fundamentals

- OSI model and industry standards
- Network topologies
- IP addressing, including subnet masks
- Networking components
- Basic network design

Second Semester Curriculum

Routing Theory and Router Technologies

- Beginning router configurations
- Routed and routing protocols
- Introduction to LAN switching

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Third Semester Curriculum

Advanced Routing and Switching

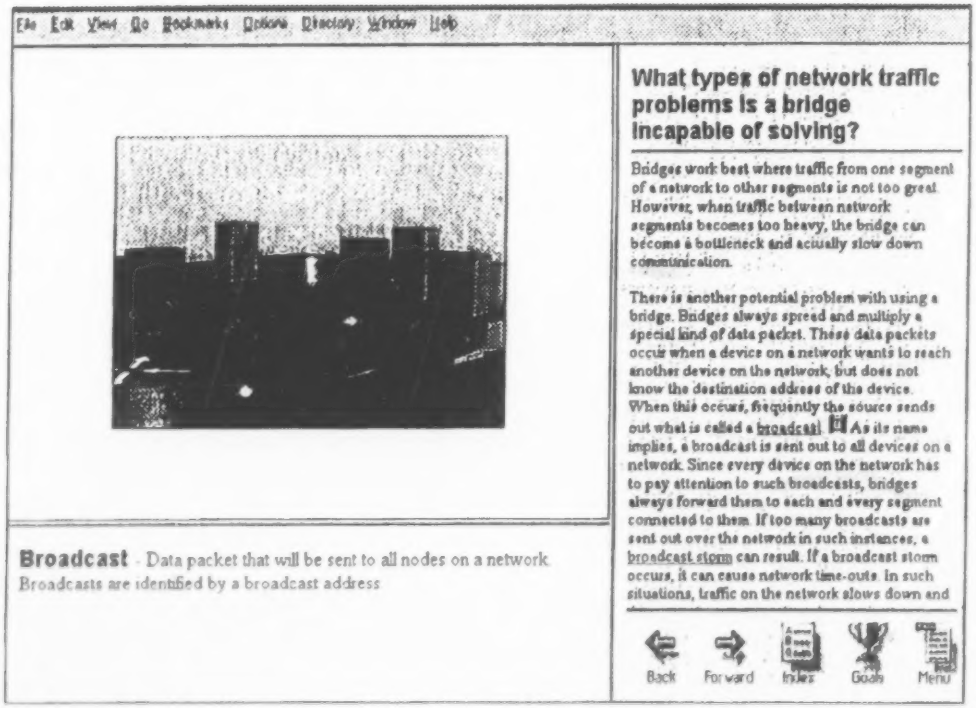
- Advanced router configurations
- LAN switching
- Network management
- Advanced network design

Fourth Semester Curriculum

Project Based Learning

- Advanced network design projects
- Advanced network management projects

Samples of Curriculum


File Edit View Go Bookmarks Options Directory Window Help
What types of network traffic problems is a bridge incapable of solving?
Bridges work best where traffic from one segment of a network to other segments is not too great. However, when traffic between network segments becomes too heavy, the bridge can become a bottleneck and actually slow down communication.
There is another potential problem with using a bridge. Bridges always spread and multiply a special kind of data packet. These data packets occur when a device on a network wants to reach another device on the network, but does not know the destination address of the device. When this occurs, frequently the source sends out what is called a broadcast. As its name implies, a broadcast is sent out to all devices on a network. Since every device on the network has to pay attention to such broadcasts, bridges always forward them to each and every segment connected to them. If too many broadcasts are sent out over the network in such instances, a broadcast storm can result. If a broadcast storm occurs, it can cause network time-outs. In such situations, traffic on the network slows down and
Broadcast - Data packet that will be sent to all nodes on a network. Broadcasts are identified by a broadcast address
Back
Forward
Index
Goals
Menu

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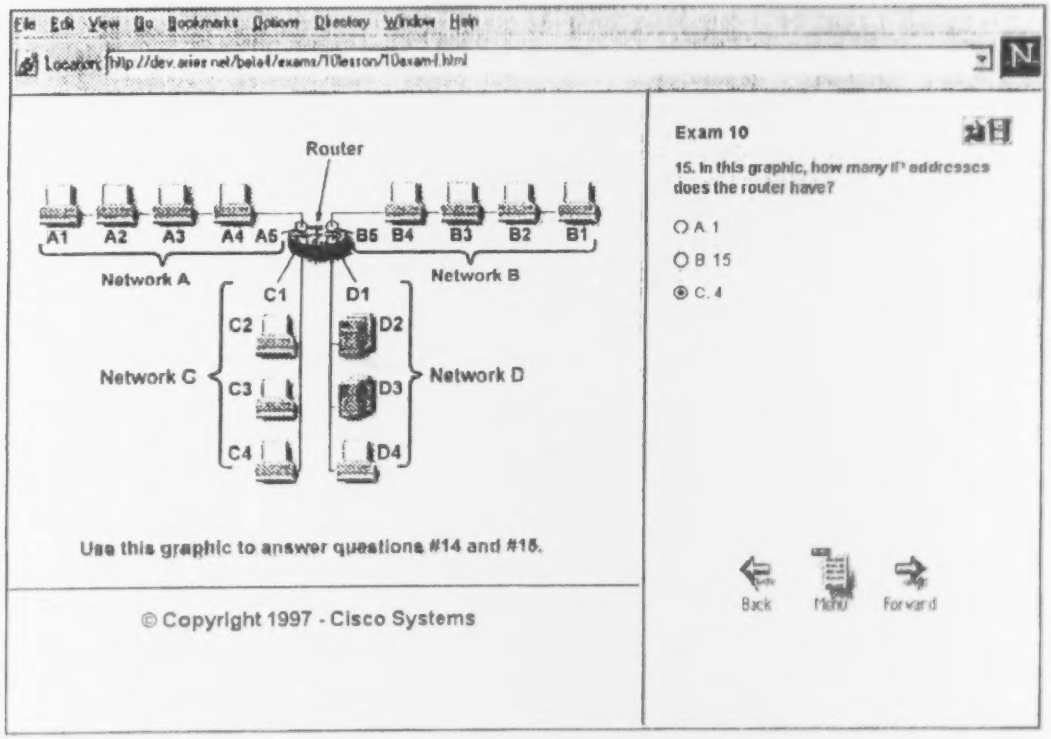
Samples of Curriculum



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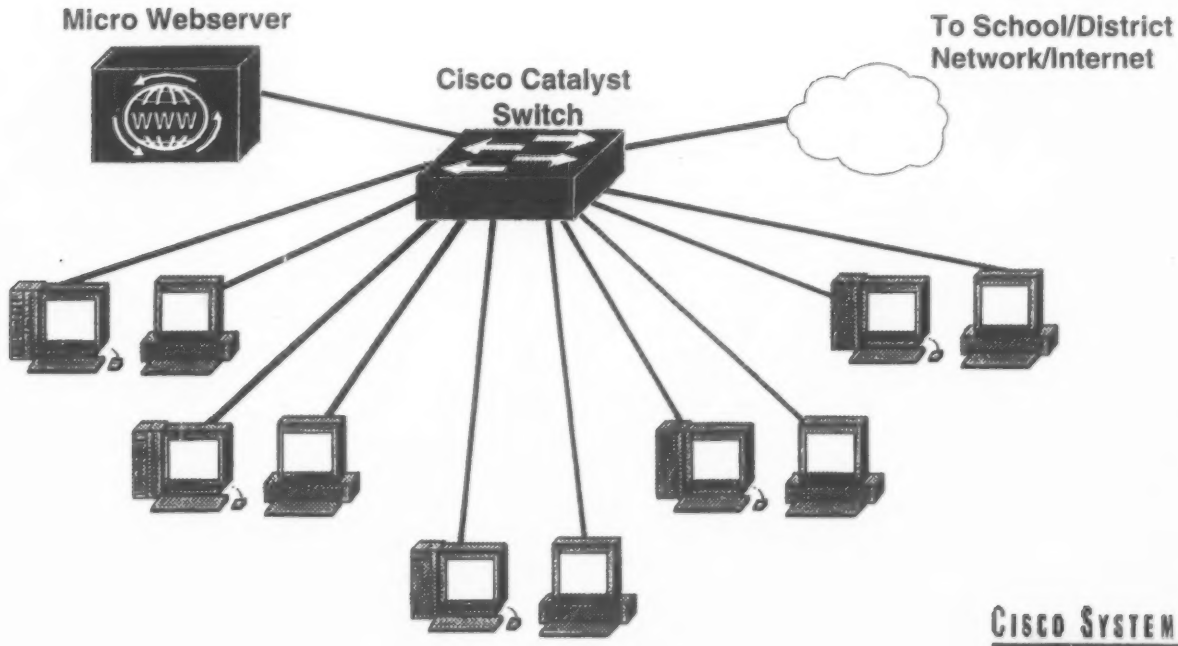
Academies Lab Configurations

Curriculum Delivery



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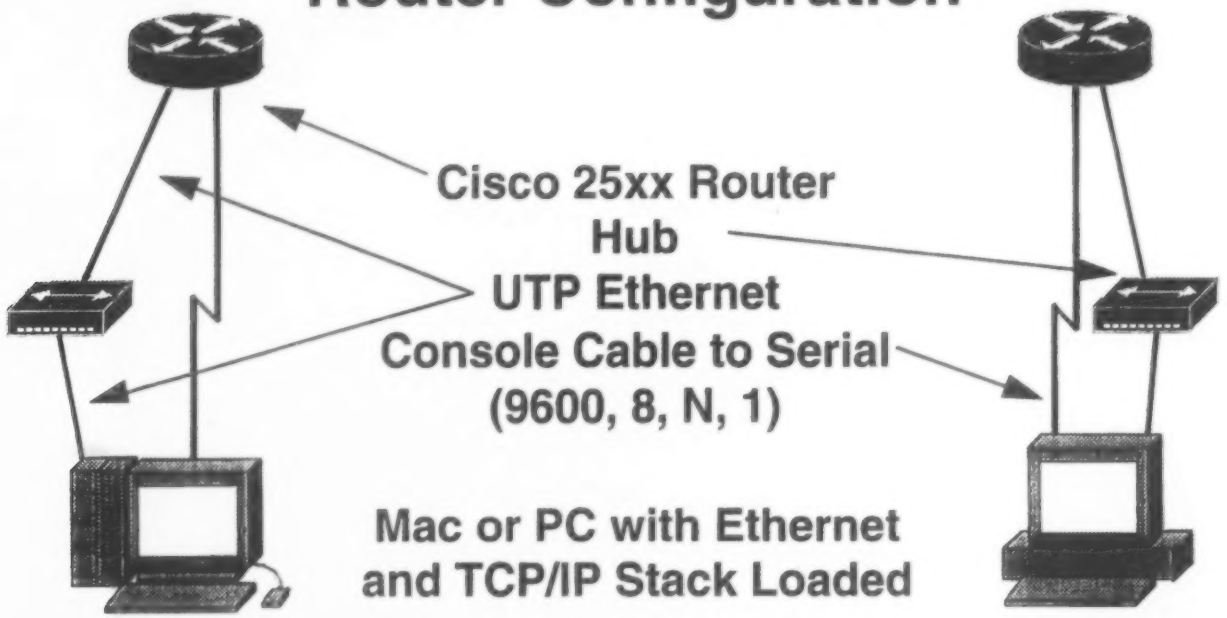
Academies Lab Configurations

Router Configuration



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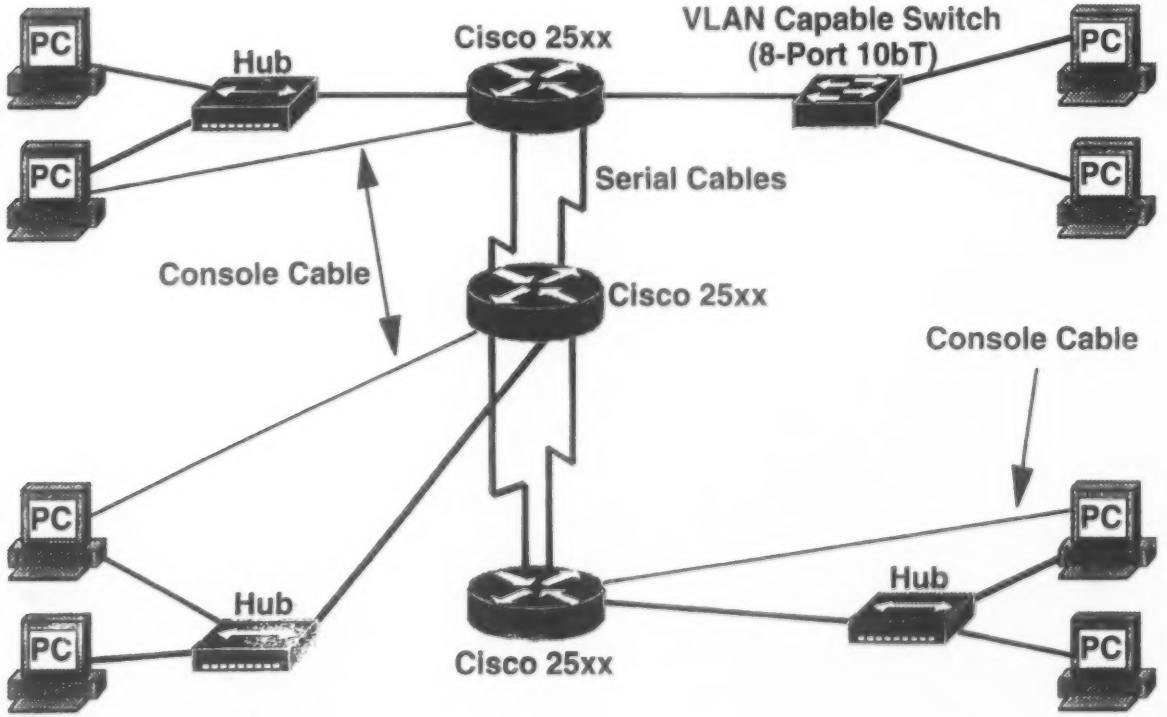
Academies Lab Configurations

Development Lab



Networking Academies: Sweeping the Country!

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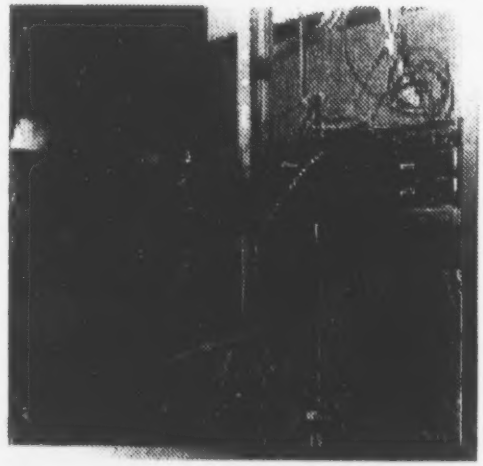
What Are Students Saying?

- "... you learn more, because you encounter problems and have to work through them to figure out the solution. It's also more fun."
- "The lessons aren't based on homework or tests so much. We do more hands-on work."
- "Anything that you can learn about computers and about technology is always going to be useful."



What Are Teachers Saying?

- "Energy level by these students is so high I cannot find words to describe the feelings"
- "All the teachers are excited about the possibilities and committed to making it happen... Monday we had to tell (the students) to leave at 5!"
- "I am very excited about the program, the trainees, and the possibilities at the local academies... I can't wait to share more with everyone!"

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What Are School Officials Saying?

"Cisco Systems has gone the extra mile in joining with Los Angeles County Schools to prepare our students to compete in the 21st Century. Through this relationship, thousands of our students will leave high school capable of entering the technical workforce."

Dr. Donald Ingwerson
Superintendent,
Los Angeles County School District

What Is Dept. of Education Saying?

"The Networking Academies program is in tune with the President's initiatives on educational technology and in the best spirit of public-private partnership... This new program will provide badly needed network support and trained students."

Linda Roberts
Director of the Office of Educational Technology
US Department of Education

What Are Senators Saying?

"By equipping our young people with skills they'll need to compete in the next century, Cisco's Networking Academies program is helping to prepare a new generation for a new set of challenges."

Senator Jay Rockefeller (D-WV)

What Is Industry Saying?

"Cisco's program is just what the doctor ordered... We're very supportive of Cisco's new Networking Academies program and eagerly await its graduates."

Marvin Bailey
Vice President,
State Technology Programs
Ameritech, Inc.

Ameritech

Cisco Systems

The Media Responds

http://www.cisco.com/edu/academies/news.html

CNN digital jam

San Francisco Examiner

CyberTimes

The New York Times on the Web

IDG News Service

San Francisco Chronicle

NBC Daytona, FL

Cox News Service

PBS Computer Chronicles

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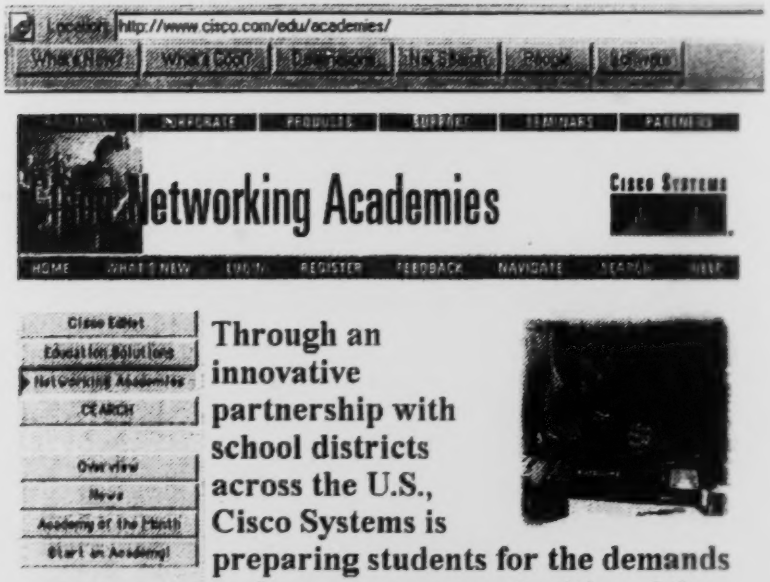
The Bottom Line...

- Students get jobs
- Schools get resources and curriculum
- Corporations get IT employees
- Government gets a public/ private sector partnership

Cisco Systems

Interested? http://www.cisco.com/edu



Through an innovative partnership with school districts across the U.S., Cisco Systems is preparing students for the demands and enormous opportunities of the information economy while creating a qualified talent pool for building and maintaining education networks.

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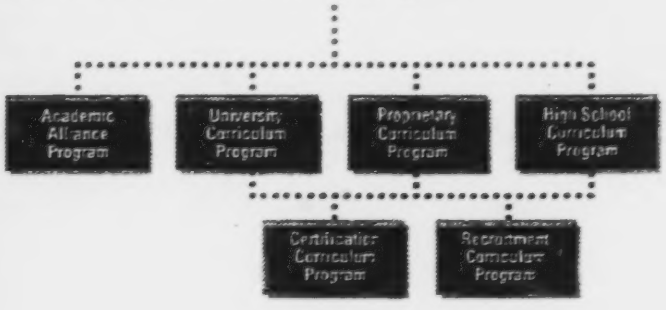
Overview
Oracle Home Page
Oracle Education

The Oracle Academic Initiative is an alliance between Oracle and education institutions around the world to address the critical shortage of IT skills in the workforce. In the academic year 97/98 Oracle expects to be working with over 50 schools and colleges, integrating Oracle courseware into their academic programs.



Oracle Academic Alliance Program (OAAP) Under this program, educational institutions can acquire Oracle world-class software products for instructional use at a current set fee of $500 per department annually with a minimum two year commitment. The program package includes 8hr/5 day support, and can be accessed by an unlimited number of users within the department.

University Curriculum Program The Oracle Academic Initiative gives students the opportunity to graduate with a hands-on knowledge of the latest thinking and practice from Oracle in information technology. Academic Institutions work in alliance with Oracle to integrate Oracle Education courseware with the academic curriculum. Additionally, students will be able to participate in a unique employment database (currently in development), which will match their skills with the requirements of Oracle's enterprise customers worldwide. Students may become even more marketable by becoming Oracle Certified which is highly regarded by IT recruiters and managers.

Proprietary Curriculum Program Oracle, the world's leading supplier of software for information management, is teaming up with for-profit educational institutions to deliver Oracle training. Students will have the opportunity to take courses similar to those offered to hundreds of corporations in over 90 countries. Students may become even more marketable by becoming Oracle Certified

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which is highly regarded by IT recruiters and managers.

High School Curriculum Program The Oracle Academic Initiative for high schools gives students an inside track to some of the best career opportunities available today, as well as preparingthem for their higher education experience. The information revolution demandshigh flexibility and an ease with technology at all levels of the organization. High schools which participate in the OAI will be able to offer courses to their studentssimilar to those that Oracle offers to customers in over 90 countries worldwide. This willallow high school students to graduate with a knowledge of some of the most sought-after information technology skills from Oracle, and an excellent foundation for further development and learning.

Certification Program OAI students can take Oracle Certification exams, becoming an Oracle Certified Professional,which should greatly enhance a studen marketability. The Oracle Certification is a widely recognized indicator of IT skills and knowledge, giving the student a significant profile with recruiters.

Recruitment Program Students will likely find the skills learned under the OAI heavily in demand among recruiters and IT management. To focus the recruitment process, Oracle's enterprise customers and other business associates will be able to participate in a recruitment database which matches their needs to the skills offered by OAI students. This service will be available to college and vocational graduates of OAI alliance institutions.

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Oracle Home Page

Oracle Education

San Francisco State University

"At SFSU we want our students to graduate with rigorous problem-solving skills, ready to apply a sound understanding of theory to real-life environments. We have been working with Oracle for some time on a number of projects, and look forward to continuing that relationship with the Oracle Academic Initiative. This flexible yet focused program blends theory and practice, helping us to prepare our students even more comprehensively for the working world."

-Robert Corrigan, President of San Francisco State University

Santa Barbara Community College

"This is a strong win-win partnership for the high-tech industry and higher education. The Oracle Academic Initiative not only helps us attract individuals from our community and teach them skills, but also offers our faculty insights into the business of innovative course content and new delivery methods. As a result, companies will see the infusion of more qualified technical professionals it so desperately needs."

-Jack Friedlander, Vice President of Academic Affairs at Santa Barbara Community College

Northern Arizona University

"Our main academic objective at NAU is to provide our students with an educational environment that can lead to independent thought, creativity, and mastery of the fundamentals essesntial to a productive life. We're working with Oracle to incorporate the Academic Initiative because we appreciate the 'field-tested' nature of the courseware and anticipate that students who take advantage of it will be better prepared for the work force."

-Patricia Meyers, Dean of the College of Business Administration at Northern Arizona University

"The University of New Orleans is extremely pleased to join Oracle Corporation in offering high-quality software education. The program, an outstanding example of cooperation between universities and the private sector, will benefit employees of government agencies and corporations in our area. Such access to advanced software training will help fuel the local economy and provide enhanced job opportunities in the New Orleans Metropolitan area."

-Gregory M. St. L. O'Brien, Chancellor, University of New Orleans

University of Montana

"The Oracle database underlies the major Montana higher education and state administrative systems, as well as many of those found in Montana corporations. Through this new academic partnership with Oracle, our students will have access to cutting edge software and an advanced technology curriculum, better preparing them to make their contribution

to the state's increasingly technology-dependent economy."

-John Cleaveland, Executive Director of Information Technology,
The University of Montana

Houston Community College

"Our partnership with Oracle enables us to offer our students a cutting edge education through world-class courseware and exposure to the latest technology. Our computer science graduates can look forward to better, higher-paying jobs and we can serve our local business community which is heavily invested in Oracle products."

-Jim Vasquez, Executive Director of Information Technology,
Houston Community College

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Press Releases
Oracle Home Page
Oracle Education

FOR IMMEDIATE RELEASE

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Nanette Mahar
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ORACLE INTENDS TO COMMIT $50 MILLION TO HIGHER EDUCATION FOR FILLING INFORMATION TECHNOLOGY WORKFORCE GAP

New Academic Initiative To Provide Software, Technology Support, Curriculum Content

ATLANTA, Oct. 13, 1997--Oracle Corp. today unveiled its intent to undertake a $50 million effort to address the worldwide Information Technology (IT) labor shortage by helping universities recruit and educate greater numbers of technically-competent graduates and match them with companies in need of their skills. Unveiled at the League for Innovation's 1997 Conference on Information Technology, the Oracle Academic Initiative (OAI) will provide academic institutions worldwide with software, support services, curriculum content, testing capabilities and staff development resources to further develop technology education programs.

The number of graduates awarded bachelor degrees in computer science has dropped from 48,000 in 1984 to 26,000 in 1995. For the 1997-98 charter year, Oracle will work with 50 schools worldwide.

"Oracle is building a unique and powerful alliance with the academic community which will creatively and profoundly address the global shortage of IT professionals," said Ray Lane, President and Chief Operating Officer of Oracle.

Program Components
OAI will integrate world-class IT courseware into mainstream education curricula at the college and university levels, greatly enhancing students' ability to move quickly and productively into the work force. In addition, as a tool for corporations looking for qualified IT candidates, Oracle intends to establish and run a database

containing names of individuals who have completed the Oracle curriculum.

Program Benefits
The OAI will benefit universities that prepare students for careers in technology, students looking forward to jobs in the IT profession and companies that rely on technically proficient individuals to keep their businesses running.

- Academic institutions will be kept up to date with IT trends and be better able to connect graduates to potential employers.
- Students will gain a thorough grounding in the principles and practice of database management, and be better-prepared for employers who are eager for these talents.
- Companies with IT positions to fill will have access to a broadened, better-trained IT professional pool, a baseline from which to evaluate potential recruits and a list of suggested universities on which to focus their recruiting efforts.

"At SFSU we want our students to graduate with rigorous problem-solving skills, ready to apply a sound understanding of theory to real-life environments," said Robert Corrigan, president, San Francisco State University. "We have been working with Oracle for some time on a number of projects, and look forward to continuing that relationship with the Oracle Academic Initiative. This flexible yet focused program blends theory and practice, helping us to prepare our students even more comprehensively for the work world."

Oracle Corporation
Oracle Corporation is the world's largest supplier of software for information management, and the world's second largest software company. With annual revenues of $6 billion, the company offers its database, tools and application products along with related consulting, education and support services, in more than 140 countries around the world.
For more information about Oracle, please call 650/506-7000. Oracle's World Wide Web address is (URL) http://www.oracle.com/.

# # #

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APPENDIX E

PeopleSoft

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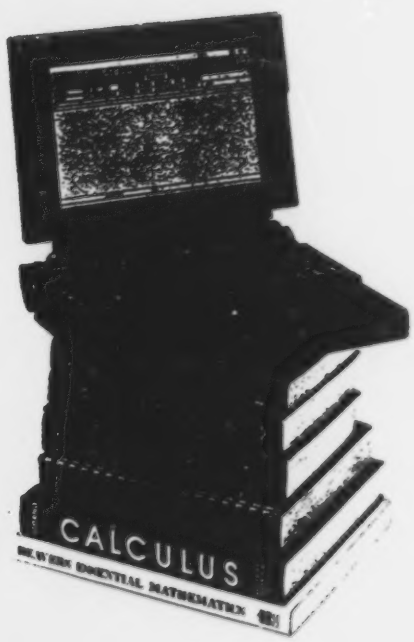
Meeting Competition Head-on with PeopleSoft

Competitive. If there's one word that epitomizes your environment in higher educatio today, that's it. You compete with other colleges and universities for students. You com for research and project funding. And you compete for alumni grants and donations. A you strive to remain competitive, among the most important tools at your disposal are t nology and systems that adapt to the way your institution does business.

Having the right technology—and software—can mean the difference between:

- Designing solutions to mirror the way you want to do business, or bending your progr to fit someone else's ideas.
- Enabling students and staff to monitor academic progress and formulate future plans, having them flounder.
- Managing finances, and federal and departmental aid, or missing out on key-opportun
- Attracting top professionals in instruction, administration, and research, or letting th best qualified people slip through your fingers.

With PeopleSoft Financials for Public Sector, PeopleSoft HRMS, and PeopleSoft Student Administration, you gain access to a single integrated source of information ab your students, staff, and finances. From recruitment and personnel administration to managing institutional finances, you can design solutions to reflect the way you manag your campus.



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PeopleSoft Financials for Public Sector on Campus

Incorporating workflow and EDI, PeopleSoft Financials for Public Sector enables you to streamline your business processes and make informed decisions. It enables your campus to monitor, administer, and report on financial information. It supports budgetary management, encumbrance accounting, and project and grant tracking. And with Financials for Public Sector you can keep abreast of the latest regulatory changes. The PeopleSoft Financials for Public Sector solution includes PeopleSoft General Ledger, Receivables, Payables, and Purchasing. Other solutions include Asset Management, Project Costing, Inventory, and Billing.

"The common access and capabilities we anticipate across our HR and Financial systems landscape are impressive...There are some very interesting places we could go. And up to now, there has never been a company that does it all, and does it well, like PeopleSoft."

Lowell Rinker, Assistant Vice President for Business, Western Michigan University

Comprehensive Management through PeopleSoft HRMS

PeopleSoft HRMS extends the role of traditional HRMS systems to focus not only on data collection, but also on providing a comprehensive knowledge-base for tracking, understanding, and deploying the skills of your collective employee base. PeopleSoft HRMS enables you to manage positions and staff, process payrolls, and comply with regulatory requirements. PeopleSoft HRMS includes Human Resources, Benefits Administration, FSA Administration, Payroll, Payroll Interface, Time and Labor, and Pension Administration.

Student Administration with PeopleSoft

PeopleSoft Student Administration provides more than the management of your studen
The system focuses on the needs of the students on your campus. Integrated with
PeopleSoft Financials for Public Sector and PeopleSoft HRMS, Student Administration
provides your university or college with on-demand access to student and financial infor
mation. Trends in higher education toward non-traditional academic programs and calen
the changing student population, matriculation, graduation requirements, and process
reengineering are also supported in Student Administration. The products in PeopleSo
Student Administration include PeopleSoft Admissions, Financial Aid, Student Record
Academic Advisement, Student Financials, and Campus Community.

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We maximize the successful deployment of our products by teaming up with industry-leading business partners to deliver a comprehensive, campus-wide solution. Therefore, our solution incorporates innovative technology, functionality, and services designed to help you succeed in implementing PeopleSoft applications.

As a customer, your partnership with PeopleSoft involves you fully in our product development process. You not only have input into the features we build into our products, you also have a say in how our product moves forward.

As a PeopleSoft customer and partner, you have a say in how our product moves forward.

And we ensure that you, as a customer, have access to the best customer service PeopleSoft can provide:

- Account managers who ensure your access to the appropriate resources during installation, training, implementation, and maintenance.
- Comprehensive education and training programs.
- Extensive documentation and customer communications.
- Professional services teams who understand the needs of higher education and offer a broad range of implementation assistance.
- PeopleSoft service partners who provide extra help to your project team when you need it.
- Product support specialists who complement account managers and provide installation services, application troubleshooting, and technical problem resolution.
- PeopleSoft Forum, our electronic bulletin board accessible over Lotus Notes, CompuServe, or the Internet.
- PeopleSoft users' groups, which meet regularly so users can share information and learn from one anothers' experiences.

The Best in Open Client/Server Technology

PeopleSoft is a leading provider of client/server software applications that offer powerfu
easy-to-use, and cost-effective alternatives to legacy systems. We have designed our solu
to take advantage of advanced technologies, such as workflow, graphical user interfaces,
distributed processing, multiple relational database and hardware configurations, and
popular desktop programs.

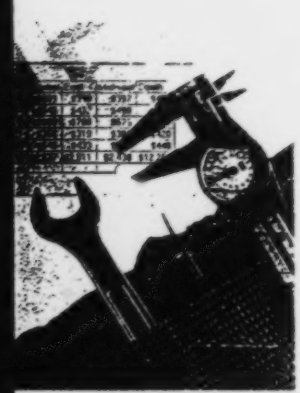
Our open and flexible approach to client/server computing enables you to choose f
a variety of databases, hardware platforms, networking components, and operating syste
So you can access information quickly and easily. Maximize system performance. Cut
And protect your existing hardware and software investments.

Automate and Streamline with Workflow

In today's rapidly changing education environment, you need solutions that not only qu
adapt to your evolving operational requirements, but also offer a new level of responsiv
and control. With PeopleSoft Workflow, you can design solutions that mirror the way
want to do business—and enable you to manage and monitor the flow of work across y
campus. Our open solutions enable you to build an open workflow network of applicat
including email, electronic forms, interactive voice response, and self-service kiosks, to
ensure you get the right information to the right people at the right time.

PeopleTools

PeopleSoft applications are built with PeopleTools. We bundle PeopleTools with our solu
so you can customize our products to suit your needs or create your own functionally ric
software. PeopleTools enable you to effectively design, deploy, maintain, and evolve yc
PeopleSoft applications—and empower users with innovative tools for accessing, mani
lating, and reporting on information stored in databases.



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Reporting Tools

PeopleSoft provides a variety of reporting functions that can facilitate data analysis throughout your organization. With PeopleSoft nVision, you can create a live link from information in your PeopleSoft database to popular spreadsheets. You can use PeopleSoft Query to extract the data you want from various databases without having to write SQL statements. And you can use our Tree Manager to build a graphic representation of hierarchical data.

Staying on Top in Your Competitive Environment

As you compete with other colleges and universities for students, for funding, and for alumni grants and donations, meeting the competition head-on will demand the use of every tool at your disposal. With PeopleSoft Financials for Public Sector, PeopleSoft HRMS, and PeopleSoft Student Administration, you gain access to a single integrated source of information about your students, staff, and finances. When it comes to selecting the right applications technology, make PeopleSoft one of your first stops. Move to the top of the class—stay ahead of the competition—with PeopleSoft.

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PeopleSoft Student Administratio

A flexible system for improving student services

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h its advanced technology and flexibility, PeopleSoft Student Administration adapts to the way you do business, enabling you to improve the quality of student services.

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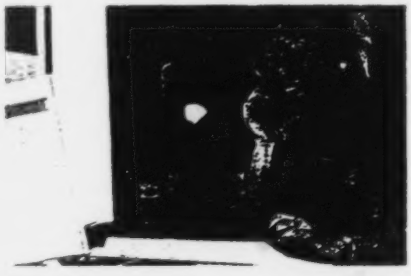
A New Vision for Campus Management

Today you have to do more with less. Compete with other colleges and universities for the best students. Proactively market for research grants and alumni contributions. Develop new, non-traditional academic programs that cater to a changing student population. All while pursuing goals of cost containment and maximizing resources.

As you strive to react to all the changes in your workplace, PeopleSoft Student Administration can help you manage your campus more efficiently and cost-effectively. From recruitment to financial aid, PeopleSoft Student Administration goes beyond administrative functions to bring a student-focused vision to your organization. PeopleSoft Student Administration includes:

- Admissions and Recruitment
- Academic Advisement
- Student Financials
- Student Records
- Financial Aid
- Campus Community

To create PeopleSoft Student Administration, we teamed up with colleges and universities who provided input into every step of the development process. As a result, our solution includes advanced functionality and technology for meeting the broad requirements of diverse institutions of higher education.



WE HELP YOU MEET YOUR UNIQUE CAMPUS ADMINISTRATION CHALLENGES WITH:

- **IMPROVED INFORMATION ACCESS**
- **INTEGRATED ENTERPRISE SOLUTION**
- **FLEXIBLE, ADAPTABLE APPLICATIONS**
- **INTELLIGENT PROCESS MANAGEMENT**

IMPROVED INFORMATION ACCESS

With PeopleSoft Student Administration, you gain access to a single integrated source of information about your students, staff, and finance: By delivering a seamless flow of data, this solution eliminates the walls that prevent people, departments, and systems from communicating with each other. So people have access to the information they need t streamline business practices, work more productively, and make better faster decisions.

PeopleSoft Student Administration also delivers information into the hands of your students. PeopleSoft applications enable you to provi information access through the Internet, interactive voice response, or self-service kiosks, giving students the ability to monitor their academic progress and formulate future plans.

INTEGRATED ENTERPRISE SOLUTION

PeopleSoft offers a complete enterprise solution for your organization with PeopleSoft Student Administration, PeopleSoft Financials for Public Sector, and PeopleSoft HRMS for Public Sector. Financials for Public Sector enables your campus to monitor, administer, and report financial information. HRMS for Public Sector provides a comprehensi set of solutions for attracting, developing, retaining, and retiring your most important asset—people. Student Administration and HRMS f Public Sector share integrated information about people—students and employees.

FLEXIBLE, ADAPTABLE APPLICATIONS

PeopleSoft Student Administration offers a complete solution that meets your requirements for adaptability. Designed specifically for client/server environments, our solution incorporates flexibility at every level.

PeopleSoft applications are scalable from a single campus to a lar multi-campus institution. Because our system is truly open, you can select the best server hardware, operating system, and database softw for your operation. With their graphical user interfaces and integrati with familiar desktop tools, PeopleSoft applications are easy to learn and help increase user productivity.

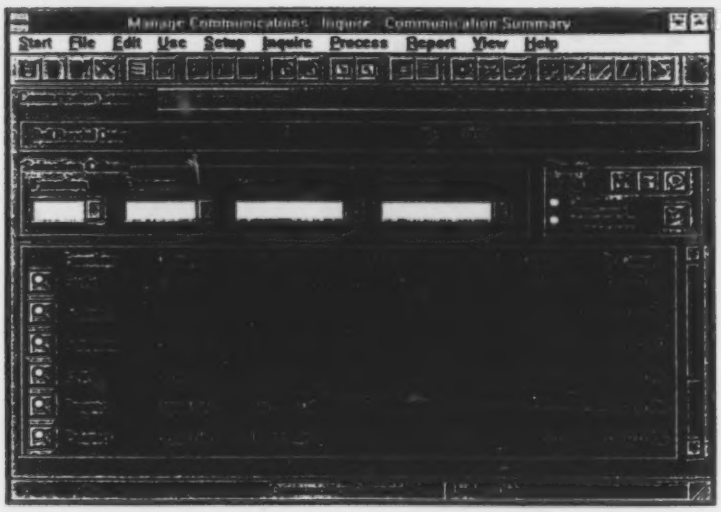
Underlying all PeopleSoft applications is PeopleTools, our robus toolset that helps you quickly develop, deploy, customize, and upgrac your applications. By providing built-in flexibility, PeopleTools help you design solutions that reflect the way you manage your campus.

INTELLIGENT PROCESS MANAGEMENT

To help you manage change, you need solutions that not only quickly adapt to your evolving operational requirements, but also offer a new level of responsiveness and control. Woven into PeopleSoft Student Administration are workflow capabilities that help you design solutions that mirror the way you work.

PeopleSoft Workflow extends the range of tasks that can be automated, facilitating your reengineering efforts, improving user productivity, and reducing paperwork. Workflow features enable you to automate the progress of admissions applications, financial aid applications, recruitment activity, and billing and collections. Workflow agents route your critical information to the people who need it when they need it, ensuring rapid information access, and improving productivity.

Workflow agents may be triggered by other important tools, checklists and communications. Checklists are user-defined to adapt to your institutional processes for tracking activities such as requirements, staff assignments, and incoming and outgoing correspondence.



The communications management checklist provides a visual summary of all incoming, outgoing and in-person contacts (letters, phone calls, meetings, e-mails, etc.) with a student.

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PeopleSoft Student Administration

A comprehensive system for campus management, PeopleSoft Student Administration enables you to provide advanced and improved services for students. Because of a unique and successful partnership with seven diverse institutions who participated in the design, development, and testing of Student Administration, this mission-critical product line addresses the complex needs of the higher education community.

Student Administration has robust applications for Admissions and Recruitment, Student Records, Academic Advisement, Financial Aid, and Student Financials, along with Campus Community, the anchor for integration which stores common biographic data.

BY INCORPORATING THE FLEXIBILITY THAT ENABLES EACH ADMINISTRATIVE OFFICE TO DEFINE ITS OWN WORKFLOWS, RULES, AND REQUIREMENTS, STUDENT ADMINISTRATION LE YOU INDEPENDENTLY TAILOR YOUR SYSTEM TO MEET THE NEEDS OF EACH OFFICE WITHOUT COMPROMISING THE BENEI OF AN INTEGRATED SYSTEM. FEATURES INCLUDE:

- **COMPREHENSIVE STUDENT AND FACULTY ACCESS AND UPDATE CAPABILITIES.**
- **ELECTRONIC PROCESS SUPPORT (EFT, EDE, EDI)**
- **USER-DEFINED SCREENS AND WORKFLOWS WITHOUT IMPACTING NEW RELEASES AND UPGRADES.**
- **INTEGRATION WITH PEOPLESOFT HUMAN RESOURCES, PAYROLL, AND FINANCIAL APPLICATIONS.**
- **EFFECTIVE-DATING FUNCTIONALITY THAT ENABLES PROJEC CHANGES IN TABLES, CATALOGS, AND OTHER DATA TO B ENTERED WITHOUT AFFECTING CURRENT DATA.**

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PEOPLESOFT ADMISSIONS AND RECRUITMENT

To effectively compete for the attention of an increasingly sophisticated student population, an efficient admissions process is critical. Admissions and Recruitment gives you the ability to plan, manage and track admissions and recruitment activities.

The system's flexibility enables you to independently tailor admissions requirements and processing for each academic program in your organization, incorporating separate evaluation criteria, calculations, and admissions policies. Admissions and Recruitment helps you maximize resources by enabling you to simultaneously plan and coordinate independent recruitment programs targeted to specific student populations.

Your admissions office can easily and efficiently handle a student applying to multiple academic programs at the same time. You can even provide students with automatic admissions decisions, based on pre-established evaluation criteria. Other capabilities include:

- Robust recruiting capabilities including data upload on potential students from various test and application databases, contact tracking, and outcome reports.
- Recruiter management functions including manual and automated recruiter assignment.
- Online entry or background processing of EDI admissions applications from central application services.
- Online entry or background processing of EDI academic transcripts from secondary and post-secondary schools.
- Mass electronic input of files from testing agencies.

- Automated transfer credit articulation for multiple academic programs and articulation agreements.
- Automated admission decisions based on user-defined criteria.

Your institution stores a vast amount of information, from course descriptions to classroom capacity to instructor availability. Student Records helps you maintain, organize and automate these records.

Student Records gives you flexibility in managing and monitoring enrollment. You define course components and establish guidelines, such as enrollment restrictions and prerequisites, ensuring that only students with appropriate preparation are enrolled. You can reserve a specific number of seats in classes based upon multiple criteria, and schedule unlimited sections in the same classroom concurrently. You can put students on class wait lists, with automatic enrollment if spots open up.

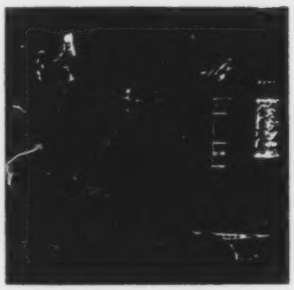
With Student Records, you can focus on the needs of your students. It supports direct student enrollment through interactive voice response, the Internet, and workstations. Students enrolled in multiple academic programs can be efficiently handled. Intermediate and mid-term grades can be recorded, enabling you to track student performance early on. Student Records features offer:

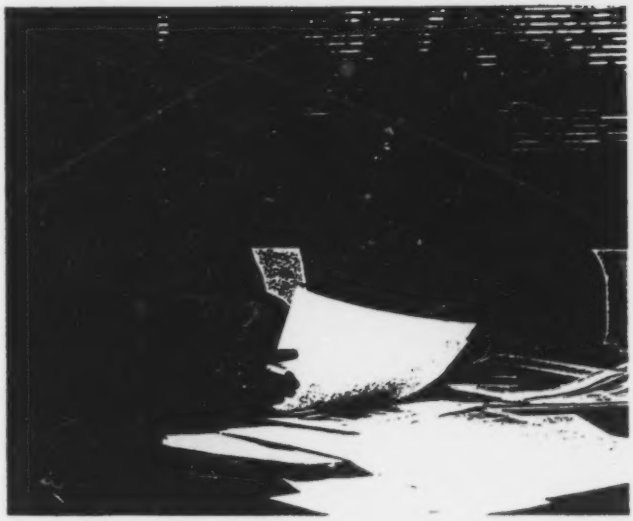
- Flexible course catalog features, such as definition of course components, course equivalencies, pre- and co-requisites, enrollment restrictions, fees, and maintenance of all data for generating printed or electronic course catalogs.
- Room and facilities database that defines all characteristics and resources associated with classrooms.
- Departmental class and room scheduling.
- Automated rollover of previous term's course schedule to new term.
- Tracking and automated verification of instructors approved to teach courses.
- Online enrollment to check co- and pre-requisites, restrictions, and schedule conflicts.
- Wait list management feature for automated enrollment from wait list and designation of course to be dropped.
- Advisement activities with ability to require advisement prior to enrollment for selected students.
- Support for multiple grading systems using intelligent grade tables (plus/minus, decimal, letter, 3-character).

PEOPLESOFT ACADEMIC ADVISEMENT

Today's students are demanding timely access to their academic records, and Academic Advisement helps you meet those demands. This automated degree-auditing tool enables students to request degree assessment reports over the telephone (interactive voice response) or the Internet. This student-centered approach offers:

- Degree program requirements with profiles based on academic, elective, and specific program requirements.
- Requirements defined and maintained independently or shared for different academic programs.
- Online or background production of degree audit and counseling report comparing student's academic program history to degree requirements for that program.
- Exemptions and substitutions of academic program requirements on an individual student basis.
- Computer-generated text based on requirement components.
- What-if analysis for comparing current academic record to other programs.





PEOPLESOFT FINANCIAL AID

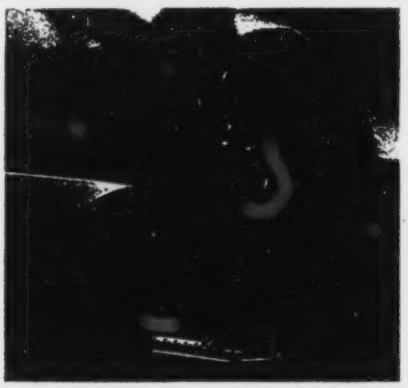
More students than ever before depend on financial aid to fund their education. Financial Aid helps you efficiently manage the awarding of federal aid, departmental aid, and scholarship programs. Workflow enables electronic input of application data as well as electronic fund disbursement.

Versatile and easy-to-use features streamline the process of evaluating student need for financial aid. Financial Aid automates the matching o financial aid sources to eligible students, letting you automatically assigr budgets to students based on pre-established criteria. Should a student's financial situation change, his or her financial aid eligibility is automati cally recalculated. Financial aid tasks and reviews are simplified by:

- Full support, with workflow integration, for all stages of federal application processing (initial or renewal applications, correction processing ISIR printing).
- Fully automated federal PELL grant management system that supports DOE electronic payment processing.
- Support for Ford Federal Direct Loan Program and Federal Family Educational Loan Program (FFEL).
- Support for need analysis with automated analysis of federal and institutional methodologies online or in background processing.
- Automated aid packaging and automated comparison to award and scholarship eligibility requirements.
- Fund disbursement and management with ability to define attributes for a variety of funds.
- Academic progress and compliance tracking as required by the DOE and/or institutional policy.
- Complete auditing of all federal and award data.
- Integration with Sallie Mae loan processing software.

PEOPLESOFT STUDENT FINANCIALS

With Student Financials, you have maximum flexibility in tracking student disbursements, charges, and payments. Flexible tuition calculation capabilities enable you to use a variety of criteria when assessing tuition, and then automatically post the charges to student accounts.



Student Financials supports and automates third party processing by providing a seamless link to the payment posting process, enabling you to process both split and/or directed payments online. Collection capabilities help you monitor all related correspondence with a student. Student Financials also provides:

- Customer maintenance allowing updates for all customers (students, parents, agencies).
- Extremely flexible capabilities for tuition calculation based on student or course characteristics.
- Online or background processing of charges and credits with input of charges to accounts at any time.
- Support for billing—including third party—and collection.
- Cashiering, including payment acceptance and application, as well as cash management and drawer functions.
- Comprehensive refund calculation rules based on both local and governmental refund policies.
- Flexible rules for distributing revenue to campus financial accounts.
- Financial management that supports ongoing, immediate tracking of profitability by course and student or by any grouping of courses and students.

PEOPLESOFT CAMPUS COMMUNITY

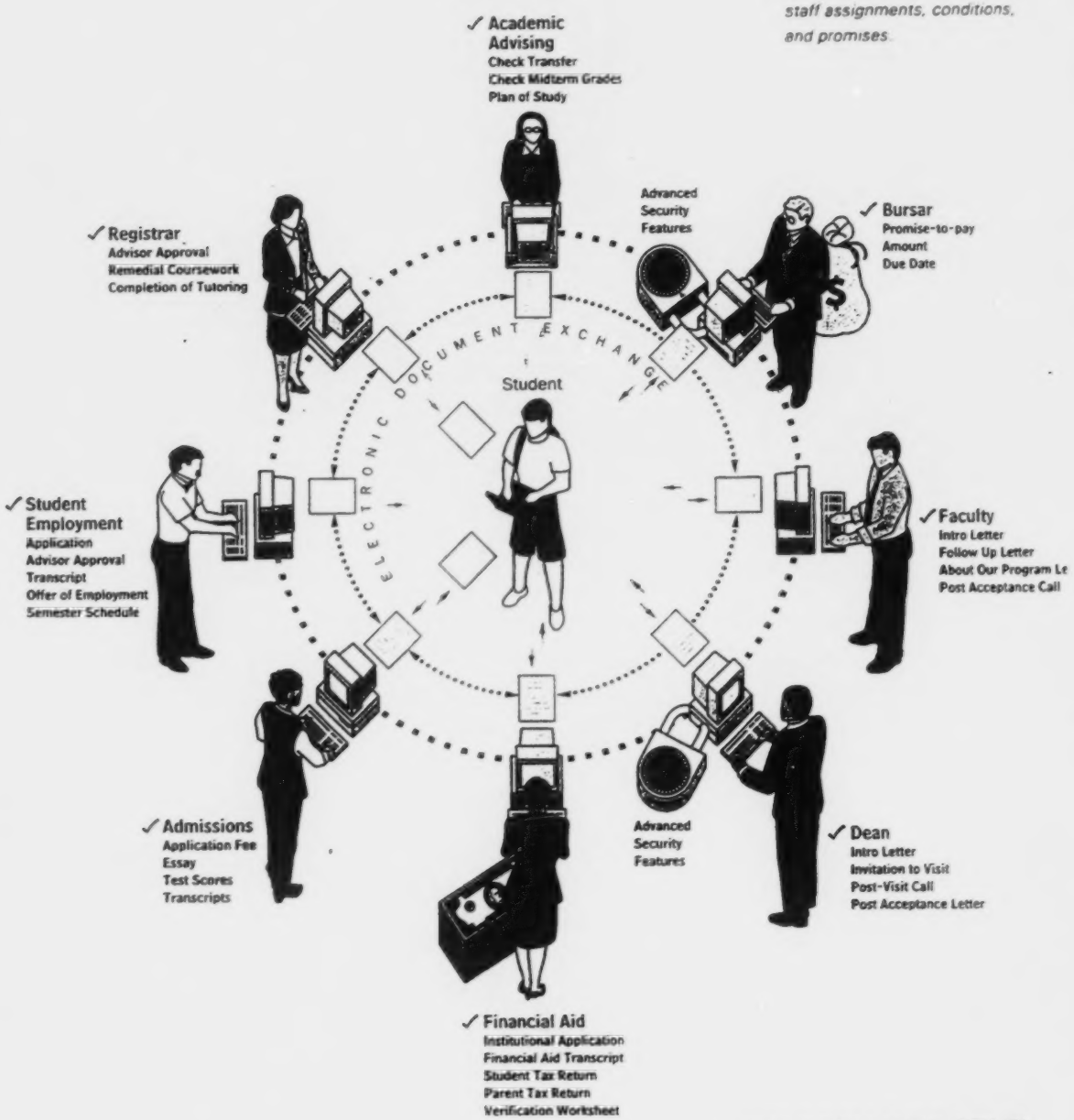
More than just a data repository, Campus Community improves productivity throughout your organization by giving the appropriate people and departments access to student biographic, demographic, and address data. With shared access and global search capabilities, duplicate records are eliminated and efficiency is increased. You determine the level of security, by choosing which departments or individuals have access to personal student information, such as grades, financial records, or special comments.

Campus Community enables you to streamline operations by giving you the ability to create checklists that monitor and automate specific activities. For example, the recruitment office can set up a communication list to automate communications with a prospective student over a period of time, beginning with the initial inquiry. The financial aid office can design a requirement list that contains items for a student to accomplish or submit to apply for financial aid. Other capabilities of Campus Community include:

- Common directory and ID database for students, employees, and related organizations and individuals.
- Service indicators to facilitate the withholding (negative) or providing of preferential (positive) levels of service.
- Online entry of comments which can be viewed across departments.
- Variety of term structures including overlapping terms and sessions that start and end at different times.
- Communication and document management, integrated with workflow processing, allowing for a complete range of correspondence options as well as initiating and tracking all forms of contact with students.

Checklist Capabilities at Work:

Checklists can be utilized by all functional areas in Student Administration for tracking requirements, communications, staff assignments, conditions, and promises.



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PeopleSoft Solutions for Higher Educatio

PeopleSoft has established a dedicated consulting organization for higher education—PeopleSoft Professional Services. In addition, numerous certified third-party consultants and industry specialists have a thorough knowledge o PeopleSoft applications and implementations, business practices, and project management to ensure your success with our solutions. Our solutions are enterprise-ready, built for people, designed for change, and customer-driven. Here's a look at the other components of PeopleSoft's enterprise-wide solutio for higher education.

PEOPLESOFT FINANCIALS FOR PUBLIC SECTOR

By focusing on the operational aspects of accounting, and by providing easy-to-use tools for accessing the information you need across departments, PeopleSoft Financials for Public Sector provides increased control over your institution. PeopleSoft Financials for Public Sector applications include General Ledger, Receivables, Payables, Asset Management, Projects, Inventory, Billing, and Budgets.

PEOPLESOFT HRMS FOR PUBLIC SECTOR

PeopleSoft HRMS for Public Sector extends the role of traditional human resource systems to focus not only on data collection, but also on providing a comprehensive knowledge base for tracking, understandin and deploying the skills of your employee base. PeopleSoft HRMS for Public Sector includes: Human Resources, Benefits Administration, FSA Administration, Payroll, Payroll Interface, and Time and Labor.

Soft

ABOUT PEOPLESOFT

PeopleSoft, Inc. was established in 1987 to provide innovative software solutions that meet the changing business demands of organizations worldwide. A client/server applications pioneer and market leader, PeopleSoft develops, markets, and supports a complete suite of enterprise applications for accounting, materials management, distribution, human resources, and campus management. In addition, PeopleSoft provides industry-specific enterprise solutions to customers in select markets including financial services, healthcare, manufacturing, higher education, the public sector, and the U.S. federal government.

With more than 1300 customers around the world, the company has been recognized for both its award-winning customer service and remarkable growth. PeopleSoft was listed by *Fortune* Magazine as one of the fastest growing companies in America in 1996. PeopleSoft product and service information is located on the World Wide Web at http://www.peoplesoft.com.

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PeopleSoft for Higher Education

You're no stranger to competition. You compete for students, research and project funding, alumni grants and donations. Now you have an ally. PeopleSoft for Higher Education gives you important financial, human resource, and student administration tools that give you an edge.

From recruitment and payments tracking to course registration and degree progress, PeopleSoft Financials for Public Sector, PeopleSoft HRMS, and PeopleSoft Student Administration give you access to a single, integrated, consolidated source of student information. In combination, these high productivity, low overhead tools help you provide enhanced service to your students, manage grant and other funding opportunities, design solutions that reflect the way you manage your campus, and attract, retain, and compensate top professionals in instruction, research, and administration.

- Enterprise Solutions
- Financing
- Industry Solutions
- Middle Market Solutions
- Tools & Technology
- Services
- Partners
- Meet PeopleSoft
- PeopleSoft Worldwide
- News &Events

- PeopleSoft Financials For Public Sector
- PeopleSoft HRMS
- Student Administration With PeopleSoft
- PeopleSoft Technology Supports Best Practices in Higher Education
- A Total Solution Through PeopleSoft Services and Partnerships
- News and Events
- Product Collateral
- 1998 Tradeshows

PeopleSoft Financials For Public Sector

Specifically designed to meet the demands of not-for-profit institutions, PeopleSoft Financials for Public Sector makes it easier for you to streamline your business processes and make informed decisions by:

- Giving you total control of all your financial transactions.
- Monitoring, administering, and reporting on financial data at every level.
- Supporting budgetary management, encumbrance accounting, and project and grant tracking.
- Incorporating PeopleSoft General Ledger, Receivables, Payables, Purchasing, Asset Management, Projects, Inventory, and Billing.

PeopleSoft HRMS

Skillfully and efficiently manage your most valuable and expensive resource -- your people -- with a comprehensive knowledge base for tracking, understanding, and deploying the skills of your employees. PeopleSoft HRMS:

- Gives you immediate access to accurate information about your personnel.
- Automates and adapts HRMS tasks and business processes.
- Lets you manage positions and staff, process payrolls, and comply with regulatory requirements.

PeopleSoft HRMS includes Human Resources, Benefits Administration, FSA Administration, Payroll, Payroll Interface, Time and Labor, and Pension Administration components for global control

PeopleSoft Student Administration

PeopleSoft Student Administration software can help you manage campus activities more efficiently and cost-effectively. Integrated with PeopleSoft Financials for Public Sector and PeopleSoft HRMS for Public Sector, PeopleSoft Student Administration enables you to control, monitor, and report on student information within your unique guidelines and practices.

Created in Partnership with Higher Education Institutions

To create PeopleSoft Student Administration, we teamed up with colleges and universities who provided input during every step of the development process. As a result, our solution includes advanced functionality and technology for meeting the complex needs of the higher education community.

Student Administration has robust applications for:

- Campus Community: improves productivity throughout your organization by giving the appropriate people and departments access to

student biographic, demographic, and address data.

- Admissions and Recruitment: gives you the ability to plan, manage, and track admission and recruitment activities.
- Student Records: helps you maintain, organize, and automate student records.
- Academic Advisement: enables students to request degree assessment reports over the telephone (interactive voice response) or the Internet.
- Financial Aid: helps you efficiently manage the awarding of federal aid, departmental aid, and scholarship programs.
- Student Financials: gives you maximum flexibility in tracking student disbursements, charges, and payments.

In the second quarter of 1997, PeopleSoft announced plans to develop two new software products for higher education: advancement and grants. For more information about PeopleSoft Student Administration, please call 888 773 8277.

PeopleSoft Technology Supports Best Practices in Higher Education

PeopleSoft Student Administration uses today's technology to help reduce costs while increasing responsiveness -- integrated EDI, the Internet, interactive voice response (IVR), self-service information kiosks, online analytical processing (OLAP), electronic catalogs and forms, and automated online workflow. All of them can help you reengineer business processes, access the right information quickly, and respond immediately to business demands.

You get the tools you need to manage change and empower users -- development tools for customization, productivity tools for information access, and data management tools to provide easy yet secure access to the information in your PeopleSoft applications.

A Total Solution Through PeopleSoft Services and Partnerships

At PeopleSoft, we're renowned for our extensive, award-winning customer service. We also partner with industry-leading vendors and consultants to extend the solutions we offer.

- You'll have ongoing access to account managers, the PeopleSoft Professional Services Group, education and training, product support, the online PeopleSoft Forum, documentation, PeopleSoft conferences, and PeopleSoft user groups through our PeopleSoft Customer Services Team.

- Benefit from the expertise of our service, platform, and application partners through our Global Alliance Program. Our service partners include the Big 6 accounting and consulting firms, as well as specialty organizations with specific higher education and PeopleSoft experience.

News and Events

PeopleSoft press releases and event listings can be obtained by calling **888-773-8277**, or you can access releases directly, simply by clicking on the titles.

Press Releases

PeopleSoft Announces General Availability of PeopleSoft Student Administration
42 Colleges and Universities to Implement Suite of Six Applications
December 2, 1997

PeopleSoft Builds Momentum in Higher Education with 20 New Customers in 1997
More than 70 Colleges and Universities Have Licensed PeopleSoft Enterprise Applications
August 21, 1997

PeopleSoft To Acquire Campus Solutions * Strengthens Position in Higher Education Market
July 22, 1997

PeopleSoft Delivers Initial Release of Student Administration * Higher Education Business Unit Also Announces Product Development Plans for Alumni and Grants Management
May 5, 1997

PeopleSoft Announces Student Administration Charter Program * Eleven Universities To Receive Software For Higher Education
October 15, 1996

PeopleSoft Gains Momentum in Higher Education Market
Jan 17, 1996

PeopleSoft To Develop First Client/Server Student Information System
Company To Offer Comprehensive Campus Solution for Higher Education Market.
April 26, 1995

University of Alberta Licenses PeopleSoft Financials and HRMS
PeopleSoft Meeting Demand For Client/Server Technology On Campuses Throughout North America
Feb. 13,1995

Product Collateral

PeopleSoft product and service information is available by calling **888-773-8277**.

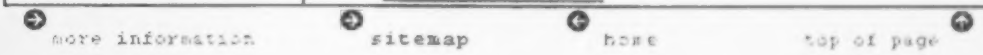
• *PeopleSoft for Higher Education*
Brochure describing the PeopleSoft solution for higher education
• *PeopleSoft for Higher Education*
White paper detailing PeopleSoft's approach in the higher education market
• *PeopleSoft Financials for Public Sector*
Brochure describing the PeopleSoft Financials for Public Sector solution
• *PeopleSoft HRMS*
Brochure describing PeopleSoft's HRMS offering
• *PeopleSoft Student Administration*
A data sheet describing the PeopleSoft Student Administration solution

1998
Tradeshows

February 8-10	**SACRO**	**Southern Association of Collegiate Registrars and Admissions Officers** Corpus Christi, FL
April 5-7	**SACUBO**	**Southern Association of College and University Business Officers** New Orleans, LA
April 12-16	**AACRO**	**American Association of Collegiate Registrars and Admissions Officers** Chicago, IL
April 25-28	**AACC**	**American Association of Community Colleges** Miami, FL
April 29		**Supply Chain Management** Nashville, TN
May 2-6	**WACUBO**	**Western Association of College and University Business Officers** Newport Beach, CA
May 17-20	**CUMREC**	**College & University Computer Users Association** Atlanta, GA
May 17-20	**AIR**	**The Association for Institutional Research** Minneapolis, MN
June 29-30		**HFMA** Nashville, TN

- **Healthcare**

- **Public Sector**
- **Federal Government**
- **Manufacturing**
- **Financial Services**



Legal Terms

APPENDIX F

Solano County CC Replacement Policy Survey

Solano County Community College District

Survey of CISO's on Equipment Replacement/Repair Policy and Procedures

District/college	Replacement Policy	Repair Policy	Comments
Yuba CCD	No	No	
Sequoias CCD	No	No	In the process of developing one. Have a budget designated in Computer services that is used for repair of district PC's
San Diego CCD	No	No	
Riverside CCD	No	No	Administrative/faculty equipment: First line support-Computer Service; Hardware - contract. Instructional, first line & hardware - instructional micro support staff effective 7/1/98.
West Hills CCD	No	No	I would appreciate getting a copy of responses.
Gavilan CCD	No	No	I would sure appreciate a copy of whatever you develop.
West Valley/Mission CCD	No	Yes	Replaced Lab PC move to faculty desks. Advocating coherent, systematic replacement policy funded above department/division level (at college/district level). Centralized hardware (all) and some software (standard admin) support. IS hardware repair budget based initially based on 1.5% of purchase cost of total PC inventory (2000 PC * $2500 = $5M * 1.5% = $75,000). This year we found we had to increase this by 1/3 (to $100,000). Software upgrade budget covers 600 admin (faculty and staff) systems only. $30,000 ($50/PC/Year) may be inadequate depending on 9 vendors software release schedules. Future strategies include the purchase of 3 year extended warranties with onsite repair. Additionally there's the issues of trained technicians (supplemented by student hourlies and adequate workspace (a significant issue for us at the moment).
Los Angeles CCD	No	No	I'd be interested in the results if you'd care to share 'em.
CCCCO	Yes	Yes	Ongoing funds in budget for 3 year lease of most PC's w/maintenance included.
State Center CCD	No	No	
Rio Hondo CCD	No	No	
Glendale CCD	No	No	About to embark on a similar task. Will send what's developed in next few months. If you receive anything useful from your request, would you mind forwarding it to me to help us too?

Solano County Community College District

Survey of CISO's on Equipment Replacement/Repair Policy and Procedures

District/college	Replacement Policy	Repair Policy	Comments
Coast CCD	No	No	District budget model is $12,000 each for 3 colleges for Administrative repairs (district control). But this is hardly enough to scratch the surface. If you get some good ones please let us know.
North Orange County CCD	No	No	
Taft College (West Kern CCD)	No	No	Last 5 years we have upgraded 1/3 our computer labs each year for a 3 year life cycle. Replaced PC's go to replace dumb terminals in support areas. Working on comprehensive technology plan using the CAUSE / League of Innovation Model "Learning Action Plan" as a guide or possibly policy. Multimedia/Network Services is a separate department with it's own maintenance supplies budget. Faculty/staff hardware/ software expenses coming from areas being serviced. Student lab areas use the MM/NS budget. No on-campus hourly charges for their people resources. Hourly "charge-backs" of time and expenses to local k-12 schools is done, including internet/e-mail network access and training under an agreement know as The Westside Consortium.
Sierra CCD	No	No	
Solano County CCD	No	No	Minor repairs (< $100) done via Audio/Visual-Media repair budget. Buy with 3yr Warranty. "Major" repairs done via departmental budgets. Old PC's "trickle down" under departmental control.

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APPENDIX G

Assistive Technology Plan

SANTA MONICA COLLEGE
CAMPUS-WIDE ASSISTIVE TECHNOLOGY PLAN

Submitted by
Ellen Cutler, Disabled Student Services, High Tech Training Center
Reviewed by
Deborah Hudson, Director of Information Management
Judy Schwartz, Coordinator, Disabled Student Services
Claudia Atmore, Faculty, High Tech Training Center

Philosophy

- Students using assistive technology will have equal access to educational opportunities including equal opportunities to work in the same labs, during the same hours, with the same instructional support as their peers.

- Ordering commonly used assistive technology as each major lab is created or upgraded ensures that this technology is an integral part of the lab equipment and software just as the blue stripes for handicapped parking places are automatically included when parking lot stripes are painted.

- As commonly-used assistive technology is available in networked versions, and as our campus-wide network permits; any member of the campus community who needs assistive technology will be able to access the programs from any networked computer on campus.

Sharing Responsibility

- Current Practice
  Providing all members of our campus community with equal access to information resources and computer technology is a joint effort shared primarily by Disabled Student Services, Instructional Computing, and the Library. Traditionally the High Tech Training Center (HTTC) staff has taken the lead in researching the appropriate technology, training people in its use, and providing on-going support to the users.

- Expanded Future Responsibilities
  As each new or upgraded lab is in the planning stages, Instructional Computing will notify the High Tech Training Center. The HTTC will then make recommendations on the best commonly used assistive technology for the lab. The HTTC will continue to take responsibility for training people to use the technology and for providing on-going support to the users. Inservice training to the Instructional Computing staff will be provided upon request. The funding source for the technology would be the same as that for the lab. The installation will be handled by Instructional Computing and/or Telecom.

- Departments/Programs developing technology-based curriculum (e.g., computer assisted instruction, web-based instruction) or services (e.g., kiosks) are encouraged to give the HTTC the opportunity to evaluate the technology in the context of universal access.

Budget Plans

- Assistive Technology funding for each new major lab and upgraded major lab will be part of the budget for the lab.
  - **Rationale**: Ordering the assistive technology as the lab is created or upgraded ensures ordering the latest, most effective assistive technology. Funding the assistive technology along with the rest of the lab equipment and software establishes the assistive technology as an integral part of the lab.

- Instructional Computing will fund site license upgrades for assistive technology jointly agreed upon by Instructional Computing and Disabled Student Services.
  - **Rationale**: Like all computer technology, assistive technology is rapidly evolving. Upgrading site licenses ensures that the assistive technology will be compatible with the industry-standard programs running in the labs. Upgrading will also ensure the best access possible which is consistent with our mission to provide universal access to state-of-the art technology.

- A consistent funding source for low-incidence, campus-wide assistive technology/ergonomic modifications will be established.
  - **Rationale**: Student need (numbers, type of accommodation) varies. Access to funding as needed would eliminate purchasing of low-incidence technology *(e.g., infrared head pointer device, onscreen scanning array)* in anticipation of needs that may or may not occur. Categorical assistive technology funds would ensure prompt responses to making reasonable accommodations, ensure purchasing current technology, and ensure that the Instructional Computing budget is not diminished by trying to meet assistive technology needs.

- The High Tech Training Center will be included in all site licenses of new industry-standard software acquisitions (e.g., MS Office, Quark Express, major curricular software packages).
  - **Rationale**: The HTTC needs the software to research its accessibility and provide training in its use in the context of assistive technology.

- Implement assistive technology needs for minilabs on a case-by-case basis.
  - **Rationale**: Far fewer students will need access to minilabs. As long as Instructional Computing has a budget for assistive technology, the minilabs can be equipped with assistive technology on an as-needed basis.

Commonly-Used Assistive Technology and Ergonomic Equipment for each Major Lab

Minimum Suggested #	Hardware/Software/Equipment
1	20 inch monitor
1	Station with larger working space to house larger monitor
1	Closed circuit television linked to 20 inch monitor for access to printed materials
3 or networked version if available	Full-featured voice output program for visually impaired and severely dyslexic students
1	Scanning station with OCR technology and voice input (Library and High Tech Training Center)
3 or networked version if available	Text voice output for auditory learners
5 or networked version if available	Magnification software
1	Voice input (dictation) technology
1	Voice input station with room dividers to block off the station as needed
1	Hands-free mouse
1	Ergonomic keyboard
1	Trackball
1	Footstool
1	Adjustable table
1	Ergonomic chair

APPENDIX H

Strategic Support Plan for the SMC Multimedia Center

STRATEGIC SUPPORT PLAN

for

BEST COPY AVAILABLE

PHASE ONE

SANTA MONICA COLLEGE

STRATEGIC SUPPORT PLAN
FOR
SMC MULTIMEDIA

PHASE ONE

DEVELOPED BY:

THE FOCUS GROUP ON STRATEGIC SUPPORT
FOR
SMC MULTIMEDIA

JUNE 12, 1998

ACKNOWLEDGMENTS

The Strategic Support Plan for Santa Monica College Multimedia (Phase One) was the product of many individual and group efforts. Direction and support, from the administration, has been ongoing since July 1996. Faculty members have been willing participants and reviewers in multimedia experiments. Classified staff and management have committed themselves to learning new skills and methodologies with an aim to contributing additional support to the instructional process.

Rocky Young, Greg Brown, Dr. Kent Hodson, Deborah Hudson, Cherry Li and the Information Services Committee of the Academic Senate provided administrative support. Dr. Kay Azuma was our first multimedia experimenter and presenter. Dr. Toni Trives, Sal Veas and the Professional Development Committee supported the staff-training program. The Media Center and Telecommunications staff provided ongoing technical assistance. To the faculty who will participate in the upcoming pilot projects: thank you, in advance, for your time and effort. Thanks to Ming-Yea G. Wei for the SMC Multimedia logo design.

The focus group that developed this plan was essential to providing a framework that signals the launch of multimedia services at SMC. Members of the focus group included: Dr. Rick Russell, Cherry Li, Steve Levine, Russ Black, LeRoy Nakamura, Christine Wilkie, and Al DeSalles. Dr. Anthony Maddox (UCLA Professor) provided us with expert knowledge and guidance on managing information and technology services.

Special thanks to Dr. Kent Hodson for his pioneering efforts in multimedia and his inspiration for the dream.

Al DeSalles
Project Director

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Appendix A: SMC Technology Master Plan References

Appendix B: 1996 Multimedia Training Proposal

Appendix C: 1998 Faculty Flex Day Proposal

Appendix D: 1996 Multimedia Research Survey

Appendix E: Production Flowchart

Appendix F: Multimedia Equipment Profiles

Appendix G: 1991 SMC Copyright Policy

Appendix H: Fair Use Guidelines for Educational Multimedia

Appendix I: The Conference on Fair Use

EXECUTIVE SUMMARY

Multimedia production and computer presentations are new to our college and differ significantly from the traditional media vehicles (film, video, transparencies and audiocassettes). However, current technology will allow educators the freedom to integrate all their presentation content into media rich modules, produce them independently or with staff support and present them with greater impact and ease-of-use.

The development and presentation tools for the future are digital! The Strategic Support Plan for Santa Monica College Multimedia (Phase One) addresses the transition from a totally analog based media support environment to a digital one. The focus group that developed this plan was comprised of faculty, classified staff, management and administrative representatives. We received professional consultation and advisement from a UCLA Professor teaching at the Graduate School of Education and Information Studies.

The focus groups' mission was to produce thoughtful dialogue, research and consensus regarding a host of issues surrounding educational multimedia at SMC.

Planning Goals

The five areas that the focus group examined were:

1. **Service Management**
   Any successful service must have a good marketing plan and a customer service component. Strategies for promotion and advertising were developed, as well as methods for measuring quality customer service.

2. **Standardizing Production Methodology**
   Multimedia design, for instructional presentations, is relatively new and untested. Instructional design was based on current presentation styles, but allows for flexibility to accommodate more innovative approaches. Aggressive production schedules were established to encourage faculty use of the new service.

3. **Team Production Models**
   Service expectations can only be realized through efficient and effective use of human resources. Team strategies were developed emphasizing communication, teamwork and production methodologies.

4. **Resource Management**
   Digital technology lends itself to use of unlimited content areas. Prudent use of copyright materials must be maintained to keep us in "safe harbors." We will begin developing our own "digital library" with content that we produce in the field.

5. **Human/Computer Interaction**
Technical failure will occur periodically as a matter of routine development and delivery of digital products. We will overcome this obstacle with human support strategies.

Planned Outcomes

After launching the new Multimedia Presentation Services in Fall 1998, the focus group anticipated the following outcomes:

- A new campus wide digital media service based on information, service and support for multimedia presenters.
- A fully trained team of media assistants ready to support the multimedia presenter with their consultation, design, production and presentation needs
- Media Center and Academic Computing Lab to support content digitization for imaging and video capture
- A new Media Center Digital Library that will catalog and index all original media objects produced at SMC and for reuse
- An opportunity for SMC educators to experiment and study the effects of multimedia as a legitimate tool for producing higher levels of student success
- Development of a multimedia website that has case histories and Frequently Asked Questions (FAQs) on classroom successes and failures using multimedia

The success of this plan is contingent upon many variables. In the experimental stage, there was a great deal of measured enthusiasm, by faculty, for multimedia presentation development. Administrative support for this service has led to a nine-month staff training program and a well-equipped production environment and delivery station. Pilot projects will be delivered at Faculty Flex Week in August 1998 and multimedia service support will begin the following week.

ON MULTIMEDIA . . .

Thinking about multimedia needs to include ideas about the fluid movement from one medium to the next, saying the same thing in different ways, calling upon one human sense or another: if you did not understand it when I said it the first time, let me show it to you as a cartoon or 3-D diagram.

Nicholas Negroponte, Director of MIT Media Lab, Author of ***being digital***

INTRODUCTION

In August 1996, a multimedia presentation was demonstrated to the faculty of Santa Monica College. The project was designed to survey the potential for Multimedia Presentations (hereinafter "MMPs") as a new instructional support service. The experiment was well received by faculty and the manager of media services given the authorization to proceed with development plans.

The **Master Plan for Technology** (Appendix A) was used as the guide for developing this new multimedia service. Instructional support goals were developed as part of a collaboration between Media Center and Academic Computing Departments and a design team chosen to work with the Information Services Committee of the Academic Senate and the administration.

The mission of the design team was to create a service that would support computer driven and media rich presentations designed to more effectively and efficiently communicate educational concepts to SMC students.

In July 1997, a comprehensive **Multimedia Training Proposal** (Appendix B) was submitted and approved for the audio/visual staff. The nine-course training program consisted of the following objectives:

- proficiency in the operation, navigation and diagnosis of PCs and storage peripherals
- understanding and knowledge of the multimedia design process
- developing, mastering and supporting cross-platform multimedia presentations

Supported with funding from the Professional Development Committee, Media Center and Academic Computing areas, the Multimedia Training Program has been on schedule and will conclude by the end of Fiscal Year 1997-98.

As an added measure to ensure a smooth transition for faculty and staff, it was recommended, by the media services manager, that a group be formed to study and discuss all of the issues related to this service prior to the Fall 1998 launch date. Guided by a UCLA Professor, specializing in Human/Computer Interaction, a Focus Group on Strategic Support for Multimedia (hereinafter "Focus Group") was formed. The focus group was composed of faculty, staff, classified management and administrative representatives. The focus group met for 2 hours weekly during a six-week period and worked to make this plan a reality.

The focus groups' mission was to study the issues directly connected with successfully creating, launching and maintaining a multimedia presentation service at SMC. Following the discussions, a *Strategic Support Plan for SMC Multimedia* would be developed as a resource guide for present and future multimedia services.

Instructional support goals for the new service included:

- Developing and maintaining quality customer service with respect to student success objectives
- Fostering superior teamwork and communication between staff and faculty
- Providing technical support and training for all MMP producers and presenters

The areas of focus for multimedia production and presentation support were:

1. Service Management
2. Standard Production Methodology
3. Team Production Models
4. Resource Management
5. Human/Computer Interaction

I. SERVICE MANAGEMENT

A. Creating Demand

Information on the new multimedia service will be officially presented during August 24-28, 1998 (faculty flex week). Faculty presentations developed during the summer, using Microsoft PowerPoint, will be the highlight of our program. Using a cross-disciplinary (academic & vocational) approach, the presenters will communicate the potential of MMPs and discuss their experiences in using the new service.

As proposed to the Professional Development Committee in March 1998 (Appendix C), the presentation/workshop day will begin with a keynote lecture on "multimedia and student success at SMC." The following hour will be devoted to faculty MMPs and a panel discussion on their perceptions of the new service. The final hour will involve several multimedia workshops in the Media Center & Academic Computing Lab.

Other vehicles for service promotion include:

- Staff Development Newsletter
- Public Information Bulletin
- Faculty Websites
- New SMC Multimedia Services Website
- The Corsair Newspaper
- Direct Mail

B. Evaluating Demand

Based on survey research from August 1996 (Appendix D), we anticipate a significant faculty demand for this new service. To effectively manage the anticipated number of fall semester requests for MMP development; production methodologies, team production models and resource management strategies were discussed.

Following our faculty flex day activities in August, another survey will be conducted. This survey is designed to measure current demand for MMPs against data results in 1996.

C. Maintaining Quality Customer Service Levels

Surveys, formal and informal, will be taken throughout the academic year to help us measure our customer service goals. Standard questionnaires will be designed and given to each faculty member following the production of MMPs. There will be secondary surveys for those interested in providing more information than there is room to accommodate on the standardized form. Survey results will determine the need for adjustments to our service mix.

II. STANDARDIZING PRODUCTION METHODOLOGY

A. Instructional Design

Instructional design for MMPs is very new and lacks a clear pedagogical foundation. MS PowerPoint was selected as the program software due to its cross platform support, reliability and ease-of-operation. PowerPoint is very flexible and contains a variety of background designs and special effects. Finally, third party software compatibility and support is "second-to-none."

Due to the fact that there is no predominant multimedia presentation format or style for teaching, our focus group felt it would be beneficial for our instructors to be able to select from several styles that could more effectively communicate their lesson plans. The first style is very basic in structure and would allow the faculty person to use the PowerPoint application to help deliver an entire lecture. Primarily text and "bullet" based, with minimal use of graphics, photos, video and sound, this method is best for those who wish to lecture in a linear style using an outline format. This instructor will likely teach in a linear progression. The second style is designed for those instructors desiring to use photos, graphics, animation, video and audio to help illustrate complex or key concepts. This instructor will most likely want to use an index for quick identification and access to their media objects. Further, these educators will seek media rich support when they want to express ideas in a different way or try alternate methods of communication. This presentation methodology will likely be non-linear. The third style is all encompassing meaning that all varieties of media objects can be used in the application. Both sequential and non-sequential pacing can occur depending on the instructor's presentation design and style of delivery.

Future styles and pedagogical designs should be based on instructional feedback. Presenters will be encouraged to experiment and make recommendations for new designs. The Media Center staff will work in conjunction with the current **Multimedia User Group** to review faculty recommendations for new instructional designs. New styles and designs will be tested using student focus groups. Periodic surveys and evaluations will be administered, to presenters and viewers, to measure effectiveness, efficiency and learning value. Results, with the permission of faculty members, will be posted on the multimedia website for all interested parties to view.

B. Optimizing Production Schedules

MMP production schedules will be based on origination and completion of (1) lesson plan or class session. Our production goal will be to complete a MMP within 5 working days from the time of origination. However, while Media Center staff and management will make every effort to meet this objective, some factors beyond our control include missed appointments, staff illness, material acquisition difficulties and equipment failure. In the event that any of these problems are encountered, we will attempt to communicate this to the presenter in a timely manner and provide alternative presentation options.

Appendix E illustrates our standard production flowchart for MMPs. This flowchart illustrates our MMP operating procedures for first-time users and repeat customers.

All MMPs will be reviewed in team production meetings on a weekly basis. Some factors that will be analyzed during these sessions include design, scope, readiness and technical rigor. Levels of customer satisfaction will be discussed with team members to ensure successful customer interface and project throughput. Successes and failures will be shared and solutions developed using team communication strategies. For example, if a hypertext link to a compact disk (CD) video sequence is not triggering the CD player upon command, the problem will be discussed in a project review meeting. Team members will share their experiences and ideas regarding hypertext and CD actuation. Further research, investigation and experimentation will eventually lead to a technical solution. This success will be reported to the team through e-mail or at another weekly meeting. This scenario will be documented and published on the Multimedia Website so that other campus multimedia producers and presenters can learn from our technical setbacks.

Faculty members will be encouraged to become involved in developing their own MMPs from beginning to end. Their primary reward will be the speed with which they can develop more of their lesson plans onto the PowerPoint program. The secondary incentive is knowing that the technology is user friendly and can be mastered quite easily. Any "early adopter" wanting to learn PowerPoint and "how-to-digitize" and import media objects will be given a training priority. If there is a large demand for formal training, in this area, this feedback will be channeled to the Director of Academic Computing.

C. Cost Containment Strategies

As part of the Technology Master Plan, cross-platform digital workstations have been acquired for multimedia production work. Numerous high powered computers with an array of peripheral devices will be available for faculty and staff use (Appendix F) by Fall 1998. In order to help reduce expenditures and maximize equipment usage, the media staff will prepare faculty MMPs using computer technology in the Academic Computing Lab.

Several disk options will be used to store and transport the MMP data from the workstation environment to the delivery platform (multimedia cart).

After MMPs are developed on the multimedia workstations, they will be stored on one of the following disks:

- 3.5" Disk(1.44MB)
- Iomega Zip Drive(100MB)
- Iomega JAZ Drive(1GB/2GB)

Reuse of disk supplies will be encouraged and incorporated at all times. Presentations will be stored on the most efficient disk available. For instance, if a presentation demands 30MB of space, it will be placed on an Iomega Zip Drive. However, if the file size is only 1.2MB it will logically be stored on a 3.5" disk. Because of the high supply cost of the JAZ Disk, it will only be used for building and storing video and animation sequences prior to compression.

Due to the costs of utilizing external disk supplies, the Media Center will not be able to distribute 100MB Zip disks. All MMPs will be stored as an archive, in the Media Center, under the instructor's name and project code. However, if an instructor would like a copy of their MMP, they simply need to supply the Media Center with a blank disk and the media assistants will generate a digital copy. Disk supplies (3.5"/Zip disks) are available in the college Bookstore.

III. TEAM PRODUCTION MODELS

A. Using Assembly Line Production Techniques

Initial projections for service demand are 10% of full-time and part-time faculty. Assuming that we begin by supporting 100 faculty members with their MMPs, it becomes highly desirable to have a production process in place that can allow staff to meet their turnaround goal, maintain consistently high product quality and provide optimal customer satisfaction.

The assembly line production model that our focus group has adopted is modeled after a combination of our graphics and reprographics production areas. Our graphic artist has always been faced with the challenge of extracting "good information" during initial client consultations. Being well informed about client objectives and content focus allows the graphic designer the opportunity to work well into the project design before any subsequent review is required. Whereas, our reprographics specialist has a more task oriented objective. They are constantly faced with deadline pressures that require an exacting methodology and set procedures for digital scanning, image manipulation, storage, retrieval and printing. Workflow must be constantly monitored and minor adjustments made to ensure timely completion. Both methodologies are clearly defined and able to be reproduced.

As elaborated in the Multimedia Training Proposal (Appendix B), our media assistants will have completed the nine-course program by June 30, 1998. This formal training of our media staff was part of a larger plan that included redevelopment of media service goals to reflect a shift to lecture support technology and its implementation in higher education. As a natural extension, "administrators, recruitment staffs, learning resource providers and staff development specialists should immediately recognize the value of this new media and actively seek this service." Therefore, rapid production on MMPs will be critical to maintaining high levels of customer service.

The three production stages for MMP development are:

1. Project Consultation (approx. 1 hour)
2. Digitization of Content (1-3 days)
3. Final Assembly and Client Review (1-2 days)

Successful completion of MMPs, within the 5 working day goal, will demand careful examination and implementation of human and physical resources.

While the media assistants will be the primary facilitators of MMP projects, they will require the help of student assistants to do the more time consuming and laborious tasks of digitizing content and providing emergency support in the classroom.

B. Effective & Efficient Communication Strategies

In order for the above assemblyline process to be successful, it is critical that all team members strive for optimal communication amongst themselves and their client base.

Some communication models that could be effective and efficient are listed below:

- Detailed records on each MMP kept in an electronic format and readily accessible to media staff via a Local Area Network(LAN)
- Using e-mail for faculty and staff communication, on MMPs, following the initial consultation
- Weekly staff meetings to review projects and surface production/operation issues

Following the completion of each faculty MMP project, instructors will be asked to complete a short survey designed to measure client satisfaction levels.

C. Faculty Interface Issues

Media assistants have traditionally interfaced with faculty members as audio/visual resource technicians. The majority of their responsibilities has typically involved managing reservations and check-out for A/V equipment, ordering films/videos, maintaining instructional resource materials and preparing A/V equipment for distribution.

Project consultations are new to the media assistants and therefore will require that they receive formal training on interpersonal communication skills. In our final course on "Mastering the Multimedia Presentation," we will spend an appreciable amount of time on developing appropriate interpersonal communication including listening techniques, note taking and follow-up communications.

IV. RESOURCE MANAGEMENT

A. Creating & Reusing Digital Resources

Digital resources, in our MMP context, can be defined as any media that is developed and/or transferred into a digital file format for reuse. In our production process, we will be working with traditional (non-digital) and digital source materials.

Some examples of traditional materials include textbooks, photographic prints, 35MM slides, audiocassettes and VHS videotapes. The non-digital materials that we choose to use for our MMPs will be digitally scanned or converted with a capture board, saved as a digital file and stored in the computer hard disk or external storage device. Once the media object is digitized and saved in a predetermined file format, it is ready for placement into the PowerPoint program.

Some examples of digital information include content from Internet web sites, i.e. still photos, sound clips and video. These digital objects can be downloaded and saved as a particular file format. Storage of digital files can be on a computer hard disk or portable storage device. As the popularity of personal computers grows, in the consumer marketplace, there will be a greater abundance of digital objects and related capture devices.

As we begin our MMP production process, we will begin using digital tools to image, convert and capture instructional content. Scanners (flatbed/35MM/negative) are available in the Academic Computing Lab for image conversion (non-digital to digital). And digital cameras can be used to capture new materials. All "field capture" objects will be electronically copyrighted with the SMC Multimedia logo and stored in the Media Center Digital Library. For example, if a Life Science Instructor wanted digital photos and video of a migrating butterfly species moving through the Malibu Canyon area, our media assistant or photographer could capture those images with a digital camera. More importantly, those images could be placed in the campus digital library and be used by any SMC faculty person for any given period of time.

As our digital library grows, our ability to reuse instructional resources, without copyright limitations, is also extended.

Due to the nature of digital information, reuse can take place with relative ease and "lossless quality." Unlike analog materials, digital copies do not degrade or suffer any "generation loss." In essence, the hundredth copy is just like the first one. In order to capitalize on this characteristic, the Media Center will catalog all their original works for the entire college community to view and use for District related applications. This collection could eventually be placed on a computer server and placed in a "free-use" library on the SMC Intranet.

B. Fair Use Privileges & Guidelines

Fair use of copyrighted materials in education is a very controversial subject. Copyright holders have a vested interest in being compensated or granting permission prior to having anyone reproduce his or her intellectual properties. Conversely, educators wish to use information to freely supplement the educational content related to their pedagogy.

According to the fair use doctrine, persons using intellectual properties or media works are "not required to notify the copyright owner" or their agent for permission and/or compensation to use the work. However, specific guidelines and conditions apply when using fair use provisions. Penalties for infringement can be harsh. U.S. Courts can award up to $100,000.00 for each separate act of willful infringement. Attorneys' fees are an additional cost.

The SMC Academic Senate Information Services Joint Committee formally addressed the copyright issue, in February 1991, as it related to the college reproduction of text and music for instructional materials (handouts). After extensive research and study, a solution was developed that protected the institution against copyright infringement. The SMC copyright policy (Appendix G) allowed the Santa Monica Community College District (SMCCD) to lawfully reproduce and distribute written information that contained copyright(s). The process, which is administered by the campus bookstore, entails identification of copyright materials, contacting the copyright holder/agent and purchasing the rights to reproduce the work. Our faculty use this process on a regular basis and incorporate copyright information into "custom course packs" which are eventually sold to our students. Additionally, as part of the fair use provisions, copyright material can be placed on reserve in the campus library for a designated period of time.

The fair use debate continues with the most recent areas of electronic reserves, distance learning, visual images, software and educational multimedia. Now, more than ever, the level of discussion related to fair use of intellectual properties and creative works is at a crescendo.

How do educational institutions create "safe harbors" of fair use without becoming hostage to technical and administrative burdens?

As early as 1994, The Consortium of Colleges and University Media Centers (**CCUMC**) had the foresight to envision the evolution and requisite obstacles that a digital environment would create for educators. They realized the need that educators would have for a reasonable amount of latitude in using fair use legislation to develop educational multimedia projects for new learning environments. Working collectively with over 100 public and private sector interest groups, the CCUMC Development Committee prepared the **Fair Use Guidelines for Educational Multimedia** (Appendix H) in July 1996. During this time the U.S. Patent and Trademark Office, under direction from President Clinton's Information Infrastructure Task Force, was beginning their first phase of the Conference on Fair Use (**CONFU**). In September 1996, "CONFU accepted the Educational Multimedia Fair Use Guidelines developed by the organizations

participating in the CCUMC." CONFU participants continued to show support (Appendix I) for the guidelines to the point of interim adoption. Although CONFU had failed to achieve consensus support in May 1997(third and final meeting in Washington D.C.), CCUMC Board Members received assurances as recent as April 1998 that their proposed guidelines were "alive and well."

The seventh course in our multimedia-training program was entitled **Fair Use Guidelines for Educational Multimedia**. The presenter for this workshop, a CCUMC Board Member and Media Librarian from Arizona State University West, used PowerPoint to present his lesson on the history and legislation surrounding copyright law. He discussed the latest information concerning multimedia fair use and incorporated media objects in his MMP based on the CCUMC Fair Use Guidelines. As part of his total package, he has given us the rights to use his MMP as a learning resource for SMC educators. This application can therefore be used as a presentation supplement in future workshops or as a self-paced tutorial on our multimedia web site.

Our focus group recommends that SMC adopt and implement the Fair Use Guidelines for Educational Multimedia as prepared by CCUMC and endorsed by CONFU.

Based upon an administrative approval to implement this fair use model, we will proceed to develop an awareness campaign for our faculty. First, we will offer a workshop during the Fall '98 Faculty Flex Week dealing specifically with Copyright Materials and Utilization of Fair Use Guidelines. Second, our media assistants will inform each faculty member, during the initial consultation, about fair use guidelines. Third, we will post a copy of the Fair Use Guidelines for Educational Multimedia for access in the Media Center as well as faculty/multimedia websites. And lastly, a Frequently Asked Questions (FAQS) list on copyright and fair use issues will be posted electronically and updated to reflect the latest discussions and legislation.

The SMCCD should in no way be held liable for copyright violations resulting from multimedia projects produced independent of the District operated multimedia support services and not in compliance with the CCUMC Fair Use Guidelines for Educational Multimedia.

C. Academic Resource Sharing

As discussed in the section on reusing digital resources (sec. IV.A), sharing information and artifacts is an inherent advantage to producing more instructional content with available resources. However, in our discussions on knowledge sharing and ownership, it was readily apparent, to our focus group, that these issues of intellectual properties need to be addressed by certain academic and administrative bodies.

V. HUMAN/COMPUTER INTERACTION

A. Seamless Technology Interface Strategies

Our focus group discussions on technology interface revolved around "ease-of-use," of presentation equipment, for our faculty.

Multimedia carts have been designed to hold the following equipment:

- (1) Laptop Computer(PC or MAC)
- (1) Video/Data Projector
- (1) VHS Video Player
- (1) Amplified Speaker
- (1) Iomega ZIP Drive

All of the above equipment fits on a small cart and can be transported, to and from the classroom, with relative ease. To begin, the Media Center will have 7 multimedia carts available for distribution.

Prior to delivering his or her first MMP, each faculty person will be given a "one-on-one" training, in the Media Center, on "how-to-use" the presentation equipment. Additionally, each cart will have a laminated "operating instructions" card available for reference. These cards will have information on equipment "start-up" and "shut-down" procedures, as well as a brief "troubleshooting" guide. Further, a media assistant or multimedia student assistant will accompany faculty to their first session if they need set-up or technical assistance. As an additional support strategy, the Media Center will have a student assistant available for dispatch to provide technical help.

Invariably, there will be a small percentage of presentations that will not perform correctly as a result of human and/or machine failure. As an ultimate "fail safe" measure and graceful exit from the MMP, every faculty person will be given a print out of their entire MMP (following the client review) so that they can continue their lesson plan in a traditional lecture format.

To further assist and acquaint faculty with common technical problems associated with delivering MMPs, a FAQs list will be posted on the multimedia website. Also, real scenarios will be documented and posted describing MMP failures and successes.

B. Design, Feedback & Evaluation Procedures

As referenced in Section II. A., instructional design for MMPs is new and untested.

Thus, SMC has a unique opportunity to conduct useful research on multimedia design and pedagogical advances using this new media for instruction.

Some methods for acquiring presenter and learner feedback are as follows:

- Formal Surveys
- Random Surveys
- Web Based Surveys
- Focus Groups
- Exit Interviews

Our focus group recommends that an implementation plan for design research come from the Office of Institutional Research.

C. Identifying "Push" & "Pull" Strategies

As a final note, our focus group felt it useful to identify the differences between "push" and "pull" strategies as it relates to MMP development and implementation. Each MMP has twin strands or threads. One strand is the "push" strand. This is represented and demonstrated by a MMP where the content and interaction is distributed and controlled by a single source (the teacher) and a distinct location (the classroom). The other strand is the "pull" strand where the viewer or learner seeks and accesses the MMP independent of the instructor and not necessarily area specific (Learning Resource Center or an Instructional Website). Both strategies give the viewer the necessary information, but each provides a distinct learning mode that can compliment and enhance the overall learning experience.

APPENDIX A:

SMC TECHNOLOGY MASTER PLAN REFERENCES

TECHNOLOGY MASTER PLAN (1996-2000)
MEDIA CENTER REFERENCES

Executive Summary

Planned Outcomes (pg. 8)

Full implementation of the Technology Master Plan will provide:

- A full service Media Center to support digitization and production of courseware, video capture and digitization, indexing, video storage, and preparation of materials for distance education classes.

Strategic Goals

Technology and Change (pg. 14)

As other forms of traffic such as voice and video start to travel on the network infrastructure, there must be more and more cross-over and teamwork between entities that were once separate departments. Experts in graphics and media must begin to work with network technicians to accomplish specific goals.

Technology Objectives 1996 - 1997

Objective 4.0 (pg. 26)

Provide a fully equipped and staffed support center for full and part time faculty where they have access to state-of-the-art equipment and support to learn how to use the standardized software suite, multimedia, email, Internet, and courseware development tools. The upgrading of equipment in this lab will be spread over a four year time period. The Academic Support Center will also be integrated into the Media Center so that the development of multimedia projects for courseware and distance education can take place there.

Objective 17.0 (pg. 39)

To begin building joint Media Center/Academic Support Center capabilities to digitize, edit, and incorporate graphics and video into courseware and presentations. This project, spread over a four year period, would culminate in the ability of faculty and staff to produce and incorporate video sequences into courseware or into classroom presentations and to broadcast them through videoconferencing or satellite to remote locations.

The current Media Center is largely analog based and vastly underutilized. The Academic Support Center is receiving more and more requests to help instructors incorporate graphics, 3-D renderings, and video into course presentations. By combining the existing facilities in the Media Center with the equipment available to faculty in the Academic Support Center (which is to be relocated to within the Media Center), the Media Center can gradually shift to digital media support which will be beneficial to classroom instructors, and to the distance education program, and perhaps eventually, the Cable TV capabilities SMC currently owns.

Technology Objectives 1997-1998

Executive Summary

It is hoped that by funding these projects (department and program projects), the paradigm shift toward "learner centered" instruction will begin to develop across the curriculum. Instructors will need media support to develop this type of instruction, however, so the continued development of the Academic Support Center and the Media/Graphics areas are crucial.

Objective 9.0 (pg. 56)

In Year 2 of this four year undertaking to provide complete media support to instructional computing and to distance education, two additional media computers will be installed in the Academic Support Center, and video capture devices and DVD recordable devices acquired. Two additional carts for presentation in classrooms will also be funded.

Technology Objectives 1998-1999

Objective 1.0 (pg. 68)

There are several PC based video editing systems currently available which allow the production of broadcast quality video using non-linear editing on PC based systems. The price of these systems is becoming extremely reasonable. The acquisition of such a system by the Media Center would allow the College to begin producing quality videos for distribution through broadcast, video servers, tapes, satellite, or videoconferencing.

Technology Objectives 1999-2000

Objective 1.0 (pg. 80)

This year the former video production studio in the Media Center will be equipped as a combined teleconference/videoconference/limited video production room. The room will allow groups of between 20 and 40 people to participate in any of the above activities, will be equipped with a large screen projection system to accommodate multimedia presentations, and will have limited video production capabilities.

Part 8 - Technology Trends in Higher Education

Need for Integration in New Media Area (pg. 123)

Electronic delivery of lectures on-demand, and the development of courseware require not just computer literacy from the faculty, but the support and knowledge of other media services such as video capture, digitization, editing techniques and other skills traditionally developed by a media center staff. The integration of these services with the computer facilities is of paramount importance in enabling this new type of instructional delivery. The old barriers between departments are being converted to new work team approaches in projects where each member of the team contributes expertise in a specialized area.

APPENDIX B:

1996 MULTIMEDIA TRAINING PROPOSAL

SANTA MONICA COLLEGE

July 22, 1997

TO: Toni Trives
Staff Development Coordinator

Sal Veas
Chair, Professional Development Committee

FROM: Al DeSalles
Media Services Manager

RE: Multimedia Training Proposal

History

Santa Monica College has traditionally relied on slide projectors, cassette recorders, overhead projectors, film projectors and more recently VHS set-ups as the communication tools of choice. In today's digital world, these analog technologies are considered "old media." With the advances in the personal computer industry, text, sound, video, animation and graphics can now be digitized, imported, manipulated, stored and delivered via the PC. This digital communication form is called "new media" or multimedia.

Technology Plan

Envisioning the use of multimedia at SMC, the architects of the Technology Master Plan developed Objective 17.0. This objective focuses on a collaboration of Media Center/ Academic Computing staff and technological resources. Executed over a four year period, this collaborative effort ". . . would culminate in the ability of faculty and staff to produce and incorporate video sequences(digital) into courseware or into classroom presentations and to broadcast them through videoconferencing or satellite to remote locations."

According to Greg Brown, director of telecommunications/media svcs., the Media Center ". . . can gradually shift to digital media support which will be beneficial to classroom instructors, and to the distance education program, and perhaps eventually, the Cable TV capabilities SMC currently owns."

-OVER-

Santa Monica Community College District • 1900 Pico Blvd. • Santa Monica, CA 90405-1628 • (310) 450-5150
Piedad F. Robertson, Superintendent and President

Institutional Value

Staff training in multimedia production can represent tremendous value to the entire college community. Primary beneficiaries of digital media projects will be our teaching staff. Faculty will have the most convenient access to our media assistants(due to their instructional support role) for help in producing educational multimedia presentations. Standard production schedules, after training, are anticipated to be 3-5 days with program updates occurring daily. With the same training given to our educational computer specialist, the college can teach basic "hands-on" production techniques to all interested staff. Digital production tools will be available for faculty check-out.

Due to the versatility and popularity of multimedia, other users will seek this new service. Administrators, recruitment staffs, learning resource providers and staff development specialists will immediately recognize the value of this new media and actively seek this service.

Staff Development Plan

The following goals have been targeted for this staff training program:

- proficiency in the operation, navigation and diagnosis of PCs and storage peripherals
- understanding and knowledge of the multimedia design process and storage/delivery options
- developing, mastering and supporting multimedia presentations

The target group for this training program will consist of the following individuals:

Al DeSalles	Media Services Manager
Steve Levine	Media Services Coordinator
Russ Black	Media Assistant
LeRoy Nakamura	Media Assistant
Warren Weitzenhoffer	Media Assistant
Lee Muller	Educational Computer Specialist
Jeff Caffrey	Internet Web Specialist(Temp./Casual)

The training schedules for each workshop and seminar are listed on the following pages. All training is scheduled to be completed by June 30, 1998.

Projected costs for individual workshops are listed. **Total costs** for the entire program is estimated at **$10,000.00**(ten thousand dollars).

SANTA MONICA COLLEGE
MULTIMEDIA TRAINING PROGRAM

09/17/97 Revision

I. Developing Computer Skills
This series of workshops is designed to enhance the skill level of the novice and intermediate level PC user. Emphasis will be on using the IBM PC and Microsoft Office '97 to develop and present future multimedia packages.

- **Orientation to Windows '95, Windows NT & MAC OS**

Basic & Intermediate
Seminar on the desktop, program and document windows, menus and commands, working with files and folders. Tips for navigating through the system and understanding various structural elements. Installing and running programs, avoiding pitfalls and learning system recovery methods. Emphasis will be on learning Windows NT as a workstation operating system for future multimedia development.

Presenter:

Support Materials:	**The ABCs of Windows NT Workstation 4.0**, Sybex,Inc., 1997 **Comprehensive Training Program for Windows '95**, video tape series, 1996 **Running MS Windows '95**, Microsoft Press, 1995
Training Schedule:	1 week learning segment (October 3-10)
Classroom Instruction:	5 hours

- **Orientation to Microsoft Office '97**

Basic & Intermediate
Examines Microsoft Office '97 package as a solutions oriented program for educational presentations. Focus will be on learning the features of MS Excel and Powerpoint. An advanced training course on Powerpoint '97 will conclude the workshop series.

Presenter:

Support Materials:	**Microsoft Office '97** Software **MS Office '97 Starts Here**, CD-ROM tutorial & book, Microsoft Press, 1997 **Office '97 Training for Windows '95**, video tape series, Viagrafix, 1997
Training Schedule:	1 week learning segment (October 17-24)
Classroom Instruction:	5 hours

- **PC Troubleshooting Techniques**

Basic & Intermediate

A "hands-on" workshop that prepares the support person to confidently seek conflicts and analyze system errors. Strategies will be explored that will lead to quick technical repairs for hardware and software conflicts. Includes proper methods for installing and "uninstalling" software programs. Explores issues regarding Hard Disk space, Read Access memory(RAM), cache, file conflicts, corrupted disks, back-up and recovery procedures. Emphasis on file recovery techniques using software tools for analysis and repair.

Presenter:

Support Materials:	**Norton Utilities '95 V2.0** Software **The Complete PC Upgrade & Maintenance Guide**(includes CD tutorial), Sybex, 1997 **Troubleshooting Your PC**, MIS Press, 1997 **PC Upgrade and Repair Bible**, IDG Books Worldwide, 1996
Training Schedule:	2 week learning segment (November 3-14)
Classroom Instruction:	10 hours

- **Understanding & Using Multimedia Hardware**

Basic & Intermediate

A "hands-on" workshop introducing multimedia hardware for the IBM PC and Macintosh. Peripherals include: flatbed scanners, CD-ROMs, JAZ external storage devices, color inkjet & laser printers, digital still cameras and video cameras(analog & digital). CD & DVD recordable technologies will be reviewed for specific applications. Various imaging formats(EPS, PICT, GIFF, TIFF, JPEG, & MPEG) will be discussed and evaluated for project requirements.

Presenter:

Support Materials:	**Digital Camera Companion**, Coriolis Group Books, 1997 **The Complete Recordable-CD Guide**, Sybex, 1997 **Working with Digital Cameras**, Coriolis Group Books, 1997
Training Schedule:	2 week learning segment (December 1-12)
Classroom Instruction:	10 hours

II. Multimedia Design Process

This series of workshops will prepare the novice developer with a greater knowledge base to begin producing nonlinear multimedia presentations. Storage, access and network delivery will be presented and discussed at length.

- **Multimedia Production Concepts**

Basic & Intermediate

A lecture based class teaching design concepts tailored to multimedia production work. Analog vs. Digital technology changes will be reviewed. Project management techniques will focus on using non-linear vs. linear strategies in preparing flow charts and storyboards. Emphasis will be on "how to" structure and develop a digital multimedia presentation.

Presenter:

Support Materials:	**Digital Video on the PC**, Micro Publishing Press, 1997 **Digital Video Studio**, Random House, 1997
Training Schedule:	2 week learning segment (January 5 - 17)
Classroom Instruction:	5 hours

- **Storing and Accessing Multimedia Programs**

Basic & Intermediate

This lecture and hands-on workshop focuses on storage and retrieval issues. Size, type and integration of files will be discussed, as well as disk space management. External disk drives will be examined as an option in standardizing a "rolling cart" approach to multimedia presentations in the classroom. Also, information will be delivered on the current and future availability of the SMC network/servers for storage and delivery of multimedia programs.

Presenter:

Support Materials:	**Handouts and Diagrams** on SMC network structures, server capacities, disk array systems(RAIDs) for video storage and the IOMEGA JAZ technology.
Training Schedule:	1 week learning segment (January 26 - 31)
Classroom Instruction:	5 hours

III. Developing the Educational Multimedia Presentation

These final workshops move the learner from a theoretical construct into a developmental stage. Pending legislation on "fair use guidelines for educational multimedia" is examined and discussed. The Internet is explored as a research tool and medium for utilizing video/graphics/animation content. Microsoft Powerpoint '97 is studied and practiced, at an advanced level, using all multimedia elements. Simulated projects are assigned to the participants and evaluated for overall effect.

- **Fair Use Guidelines for Educational Multimedia**

Basic & Intermediate

This seminar informs us about legal guidelines that are pending legislative action. These new guidelines, for multimedia, are framed against the existing laws regarding copyright protection. Possible outcomes for legislative action are discussed.

Presenter:

Support Materials:	**Handouts** include copyright law handbook(U.S. Copyright Office) and CCUMC Fair use Guidelines for Educational Multimedia
Training Schedule:	1 week learning segment (February 2 - 6)
Classroom Instruction:	3 hours

- **Surfing the Net**

Basic & Intermediate

An information based workshop designed to assist the learner in developing research skills via the Internet. Finding "good" information and tracking sources to help build well researched educational content. Methodology in downloading text, graphics, audio, video and animation.

Presenter:

Support Materials:	**Teach Yourself the Internet in 24 hours**, Sams Publishing, 1997 **Discover the World Wide Web**, Published by IDG Books Worldwide, 1997 **How the Internet Works**, Ziff-Davis Press, 1996
Training Schedule:	2 week learning segment (February 17 - 27)
Classroom Instruction:	10 hours

- **Mastering the Multimedia Presentation Using MS Powerpoint '97**

Intermediate & Advanced

This 3 month course is a learning intensive segment that incorporates all the information form previous workshops and lectures. Text, graphics, photos, animation and video are all imported, manipulated and exported onto external storage devices. Upon achieving the advanced level, all learners will be assigned simulated educational projects to complete within 3-5 day turnaround times. Projects will be evaluated for efficiency, accuracy, visual quality, timing, and the ability to stay within proposed "fair use" guidelines.

Presenter:

Support Materials:	**Powerpoint '97 for Windows for Dummies**, IDG Books Worldwide, 1997
	Using Microsoft Powerpoint '97, Que Corporation, 1997
	Creating Cool Powerpoint '97 Presentations, IDG Books Worldwide, 1997
Training Schedule:	3 month learning segment(March 2 - May 29)
Classroom Training:	10 hours

APPENDIX C:

1998 FACULTY FLEX DAY PROPOSAL

1998 FACULTY FLEX DAY PROPOSAL

I. KEYNOTE SPEAKER

Time: 11:00am-11:50am
Place: Concert Hall

The Value of MultiMedia in the Classroom
Lecture and discussion on "multimedia and student success at Santa Monica College." Emphasis on using multimedia to communicate key concepts more efficiently and effectively, develop greater understanding and increase knowledge retention.

II. FACULTY PRESENTATIONS & PANEL DISCUSSION

Time: 1:00pm-1:50pm
Place: Concert Hall
Presenters/Panelists: Kay Azuma, Rick Russell, 2-4 Other Faculty TBA

Developing & Presenting a MultiMedia Presentation
Four to six SMC faculty members will present their multimedia projects, prepared by the media staff, using the Microsoft PowerPoint Program. This will be a multi-disciplinary approach with a mix of academic and vocational areas. **Approx. 30 min.**

Following the presentations, faculty panelists will answer questions regarding their impressions of the new multimedia production service, the usefulness of a non-linear "media rich" approach in the classroom, and the advantages/disadvantages of using high technology tools. **Approx. 20 min.**

III. MULTIMEDIA WORKSHOP

Time: 2:00pm-3:00pm
Place: Media Center & Academic Computing Lab
Facilitators: Al DeSalles, Steve Levine, Russ Black, LeRoy Nakamura, and Christine Wilkie

Discovering a New Media Service
This workshop is designed to inform and attract "early adopters" to the new multimedia service. Workshops will be divided into the following three groups/areas:

1. Copyright Material and Utilization of Fair Use Guidelines **20 min.**
2. Digitizing Content Using Equipment in the Academic Computing Lab **20 min.**
3. What is the Multimedia Cart and how does it work? **20 min.**

RECOMMENDED:
Additional Training for Faculty, during FY 1998-99, on **"How to Effectively Present Information to SMC Students Using Microsoft PowerPoint."**

APPENDIX D:

1996 MULTIMEDIA RESEARCH SURVEY

MULTIMEDIA RESEARCH SURVEY

TARGET AUDIENCE:	Santa Monica College F/T Faculty
NATURE OF THE STUDY:	Survey designed to measure the following: •current use of instructional media other than Xerox handouts •value of multimedia as an instructional presentation tool •potential effectiveness of multimedia in communicating key concepts •level of technical support desired in multimedia presentation development •potential classroom usage of multimedia presentations based on highest level of development support
STUDY METHOD:	Written Survey
THE SAMPLE:	Target Sample Group
SAMPLE SIZE:	Session I - 33 F/T Faculty Session II - 41 F/T Faculty
INTERVIEW PERIOD:	August 23, 1996(Faculty Flex Day)

MULTIMEDIA PRESENTATION SURVEY

1. Do you currently use any type of media, other than handouts, in the classroom?

   ☐ YES ☐ NO

2. Do you believe there are instructional benefits to using multimedia, as a presentation tool, in the classroom?

   ☐ YES ☐ NO (If no, please skip to Ques. #6)

3. Please rate the *potential effectiveness* of using multimedia presentations in communicating key concepts to your students.

   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
   Lowest Highest

4. If you were to make use of multimedia presentations, what level of technical support would you desire in the development phase.

   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
   Lowest Highest

5. If given the highest level of development support, how many times *per month* would you deliver multimedia presentations.

   ☐ 1-2 ☐ 3-5 ☐ 6-9 ☐ 10-14 ☐ 15+

6. Please describe your feelings about any *future use* of multimedia presentations in the classroom.

   _____

   _____

   _____

Thank you for taking this survey. Your input makes a difference!

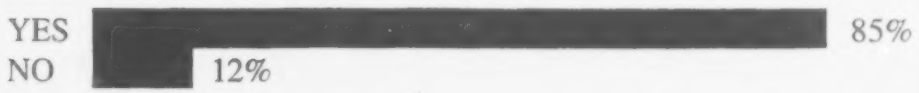
8/23/96 SMC Faculty/Session II

SURVEY RESULTS - SESSION I

INTERVIEW PERIOD: Aug. 23, 1996
SAMPLE SIZE: 33 F/T Faculty
SCALE: 0-100%

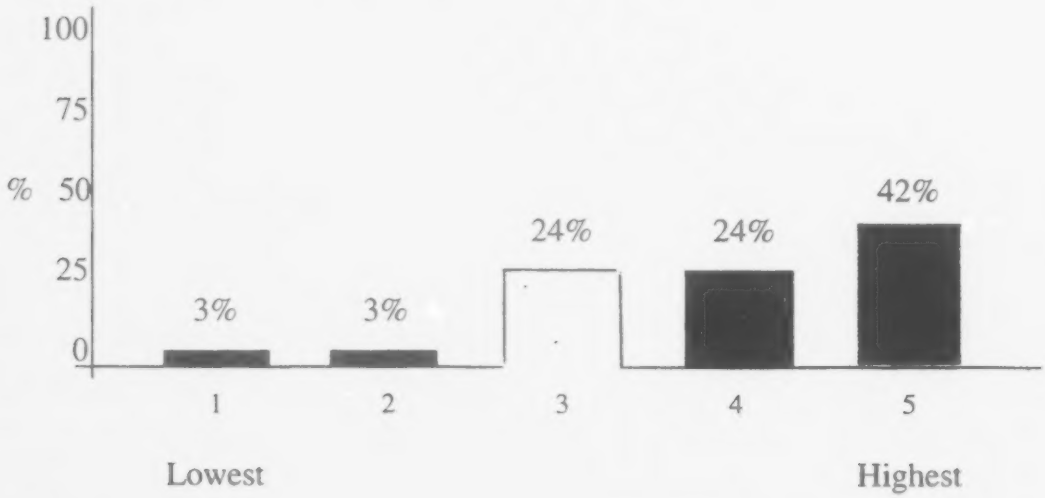
QUESTIONS:

1. Do you currently use any type of media, other than handouts, in the class room?



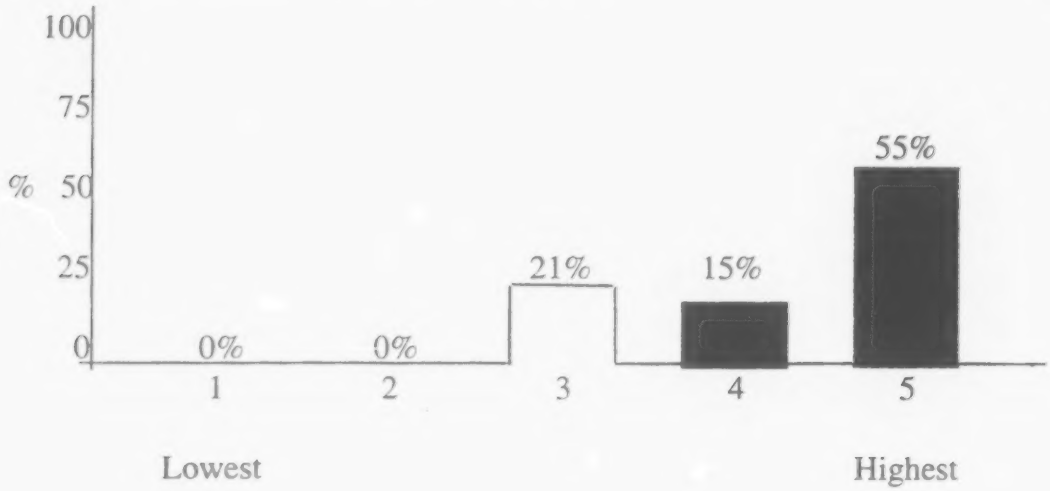
2. Do you believe there are instructional benefits to using multimedia, as a presentation tool, in the classroom?

3. Please rate the *potential effectiveness* of using multimedia presentations in communicating key concepts to your students.

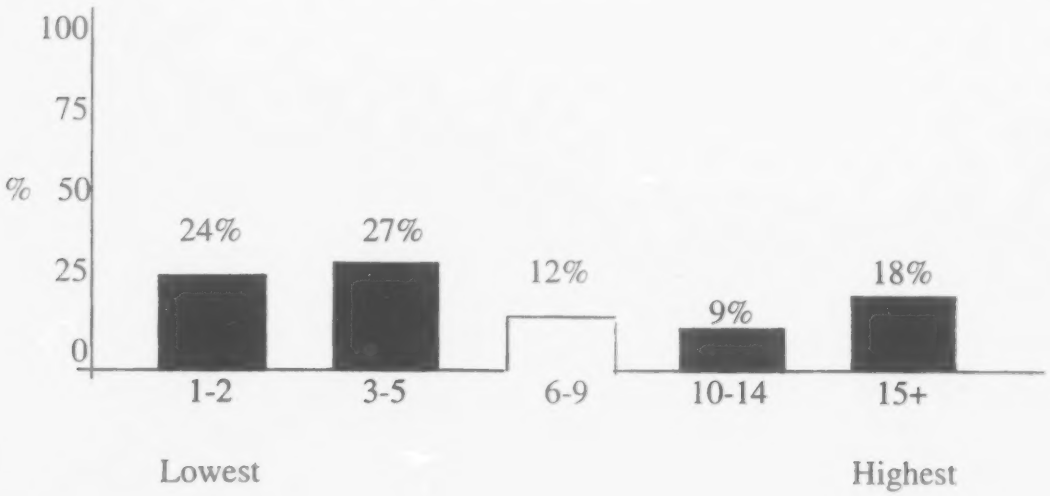


-OVER-

4. If you were to make use of multimedia presentations, what *level of technical support* would you desire in the development phase.



5. If given the highest level of development support, how many *times per month* would you deliver multimedia presentations.



SURVEY RESULTS - SESSION II

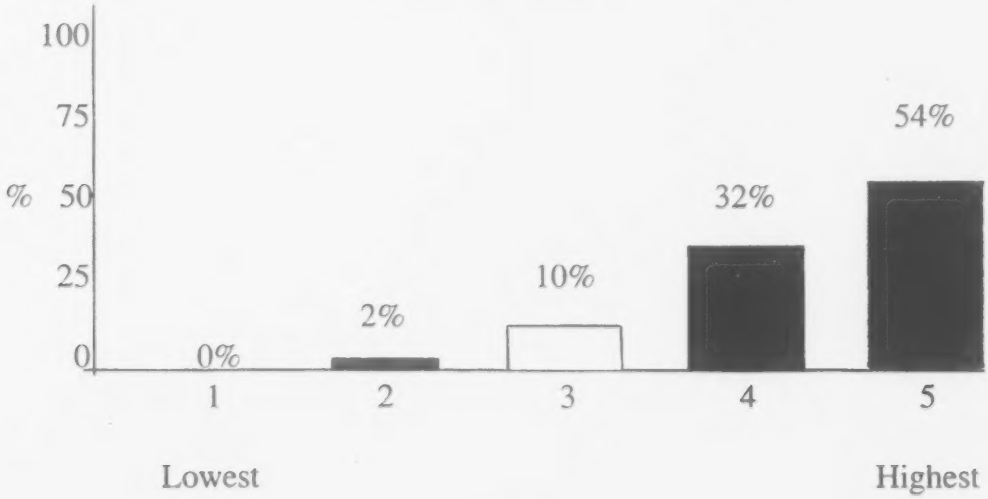
INTERVIEW PERIOD: Aug. 23, 1996
SAMPLE SIZE: 41 F/T Faculty
SCALE: 0-100%

QUESTIONS:

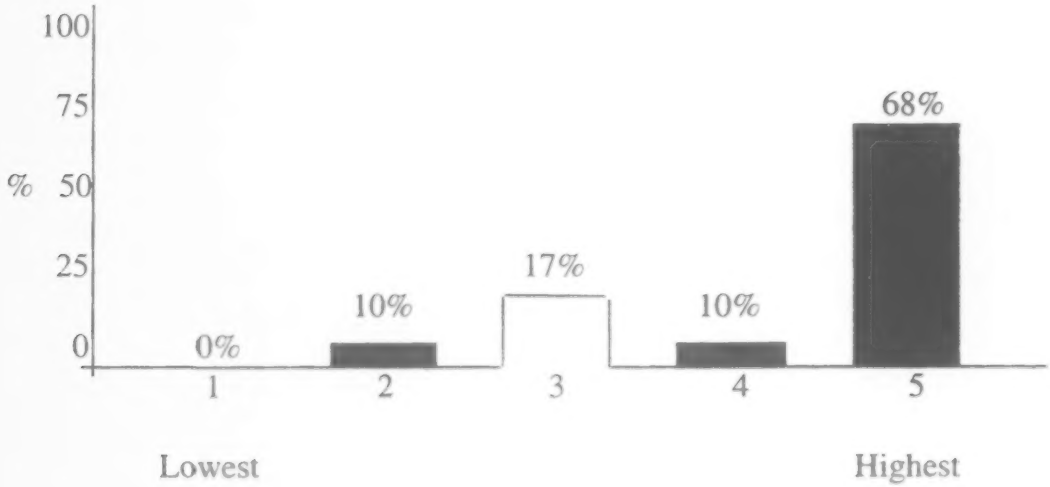
1. Do you currently use any type of media, other than handouts, in the class room?

2. Do you believe there are instructional benefits to using multimedia, as a presentation tool, in the classroom?

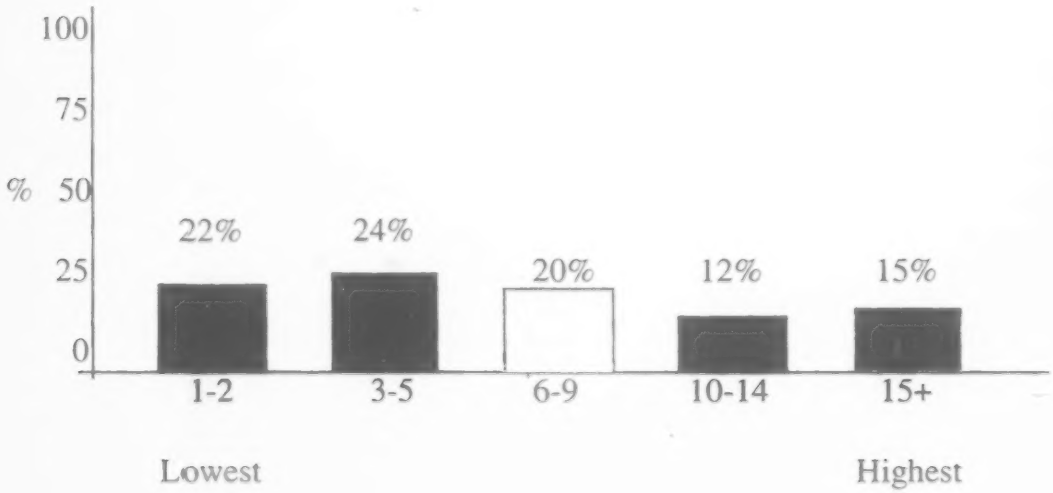
3. Please rate the *potential effectiveness* of using multimedia presentations in communicating key concepts to your students.



4. If you were to make use of multimedia presentations, what *level of technical support* would you desire in the development phase.



5. If given the highest level of development support, how many *times per month* would you deliver multimedia presentations.



APPENDIX E:

MULTIMEDIA PRODUCTION FLOWCHART

PRODUCTION FLOWCHART

Step 1 – Initial Consultation (Approx. 30 minutes)

This is the opening stage where faculty members come to the Media Center for information on the new multimedia presentation services. Media assistants will provide instructors with a general overview of our program along with information on Microsoft PowerPoint, presentation styles, production scheduling, faculty participation and multimedia cart orientation. Consultation appointments are requested.

Step 2 - Designing the MMP (Approx. 1 hour)

Faculty meets privately with a media assistant to discuss communication objectives, preferred style of layout and presentation, content needs, material submission and presentation review scheduling.

Step 3 – Digitizing and Assembling Content (1-3 days)

Media Assistant assigns Multimedia Student Helper to digitize instructor's materials in the Academic Computing Lab. If needed, Media Assistant collects "field capture" objects (photos, video and sound) for original content development.

Step 4 – Final Assembly and Client Review (1-2 days)

Media Assistant assembles the presentation and contacts the faculty person for a project review. Minor modifications made if deemed necessary. Faculty will be given a printout of their entire presentation, which can be used as "back-up" lecture notes in the event of technical difficulties during the presentation.

Step 5 – Classroom Support

Faculty can request to have a Multimedia Student Assistant accompany them during their **first** presentation. During this engagement, the student assistant will provide technical support upon request.

With respect to getting help for future technical problems, the Media Center staff will have multimedia student assistants available for classroom emergencies. Faculty can send one of their students to the Media Center for this dispatch service.

Note: Steps 1 and 5 will only be incorporated for the initial multimedia presentation. Thereafter, steps 2-4 will typify the standard production flow.

APPENDIX F:

MULTIMEDIA EQUIPMENT PROFILES

MULTIMEDIA EQUIPMENT PROFILES

Academic Computing Lab Multimedia Workstations

Imaging (PC & Mac)

- High End Computers (2)
- Flatbed Scanners (2)
- 35MM/Negative Scanners (2)
- Color Printer (1 networked)
- 100MB/1GB/2GB External Storage Drives (4)

Video Capture/Editing (PC & Mac)

- High End Computers (2)
- Video Capture Boards (2)
- S-VHS Player/Recorders (2)
- DVD Players (2)
- NTSC Monitors (2)
- Color Printer (1 networked)
- 100MB/1GB/2GB External Storage Drives (4)

-OVER-

Media Center MM Presentation Carts

- IBM PC Laptop Computers (4)
- Power Mac Laptop Computers (3)
- Video/Data Projectors (7)
- VHS Players (7)
- Amplified Speakers (7)
- 100MB External Storage Drive (7)
- Portable Carts (7)

Note: Equipment profiles based on upgrades purchased in June 1998. Completed installations projected for August 1998. Digital still cameras (PC & Mac) and VHS camcorders available in the Media Center for single-day check-out.

APPENDIX G:

1991 SMC COPYRIGHT POLICY

TO: Department Chairs
FROM: Mona Martin
RE: Copyright Information
DATE: March 18, 1992

Dear Colleague,

On February 21, 1992, the Academic Senate's Instructional Support Services Committee facilitated a panel discussion entitled "Copyright Laws: Relations to Instruction." The purpose of this session was to inform faculty of copyright permission requirements for both selling materials in the SMC Bookstore and for classroom distribution.

While over eighty faculty members attended, there are many who were unable to attend who will be affected by the college's policies. In order to make sure all faculty are aware of the policy for selling materials in the bookstore, and are aware of the Fair Use Guidelines, I am asking that you distribute a copy of the attached information to all faculty in your department (both fulltime and parttime).

If there are any questions regarding copyright in your department, please feel free to call me at extension 9692.

Thank you for your assistance in distributing this information.

c: Elmer Bugg, President, Academic Senate

Agreement on Guidelines for Classroom Copying in Not-for-profit educational institutions With Respect to Books and Periodicals

The purpose of the following guidelines is to state the minimum and not the maximum standards of educational fair use under Section 107 of H.R. 2223. The parties agree that the conditions determining the extent of permissible copying for educational purposes may change in the future; and conversely that in the future other types of copying not permitted under these guidelines may be permissible under revised guidelines.

Moreover, the following statement of guidelines is not intended to limit the types of copying permitted under the standards of fair use under judicial decision and which are stated in Section 107 of the Copyright Revision Bill. There may be instances in which copying which does not fall within the guidelines stated below may nonetheless be permitted under the criteria of fair use.

GUIDELINES

I. Single Copying for Teachers

A single copy may be made of any of the following by or for a teacher at his or her individual request for his or her scholarly research or use in teaching or preparation to teach a class:

A. A chapter from a book;
B. An article from a periodical or newspaper;
C. A short story, short essay or short poem, whether or not from a collective work;
D. A chart, graph, diagram, drawing, cartoon or picture from a book, periodical, or newspaper.

II. Multiple Copies for Classroom Use

Multiple copies (not to exceed in any event more than one copy per pupil in a course) may be made by or for the teacher giving the course for classroom use or discussion, provided that:

A. The copying meets the tests of brevity and spontaneity as defined below; and,
B. Meets the cumulative effect test as defined below; and,
C. Each copy includes a notice of copyright.

Brevity

(i) Poetry: (a) a complete poem if less than 250 words and if printed on not more than two pages, or (b) from a longer poem, an excerpt of not more than 250 words.
(ii) Prose: (a) Either a complete article, story or essay of less than 2,500 words, of (b) an excerpt from any prose work of not more than 1,000 words or 10 percent of the work, whichever is less, but in any event a minimum of 500 words.
[Each of the numerical limits stated in (i) and (ii) above may be expanded to permit the completion of an unfinished line of a poem or of an unfinished prose paragraph].
(iii) Illustration: One chart, graph, diagram, drawing, cartoon or picture per book or per periodical issue.
(iv) "Special" works: Certain works in poetry, prose or in "poetic prose" which often combine language with illustrations and which are intended sometimes for children and at other times for a more general audience fall short of 2,500 words in their entirety. Paragraph)ii) above notwithstanding, such "special works" may not be reproduced in their entirety; however, an excerpt comprising not more than two of the published pages of such special work and containing not more than 10 percent of the words found in the text thereof, may be reproduced.

Spontaneity

(i) The copying is at the instance and inspiration of the individual teacher, and
(ii) The inspiration and decision to use the work and the moment of its use for maximum teaching effectiveness are so close in time that it would be unreasonable to expect a timely reply to a request for permission.

Cumulative Effect

(i) The copying of the material is for only one course in the school in which the copies are made.
(ii) Not more than one short poem, article, story, essay or two excerpts may be copied from the same author, nor more than three from the same collective work or periodical volume during one class term.
(iii) There shall not be more than nine instances of such multiple copying for one course during one class term.

[The limitations stated in (ii) and (iii) above shall not apply to current news periodicals and newspapers and current news sections of other periodicals].

III. Prohibitions as to I and II Above

Notwithstanding any of the above, the following shall be prohibited:

A. Copying shall not be used to create or to replace or substitute for anthologies, compilations or collective works. Such replacement or substitution may occur whether copies of various works or excerpts therefrom are accumulated or reproduced and used separately.
B. There shall be no copying of or from works intended to be "consumable" in the course of study or of teaching. These include workbooks exercises, standardized tests and test booklets and answer sheets and like consumable material.
C. Copying shall not:
    (a) substitute for the purchase of books, publishers' reprints or periodicals;
    (b) be directed by higher authority;
    (c) be repeated with respect to the same item by the same teacher from term to term.
D. No charge shall be made to the student beyond the actual cost of the photocopying.

BEST COPY AVAILABLE

MATERIALS TO BE SOLD IN THE BOOKSTORE

- Material to be reproduced by the Media Center and sold in the bookstore must be taken to the bookstore manager for copyright clearance. Material shall be compiled in course packets. For each course packet a "Declaration of Copyright" form must be filled out and filed at the bookstore.

- Course packets containing copyrighted material can be reproduced so long as proper permission is received in writing. If you have any questions regarding copyrighted material please see the *Q & A on Copyright for the Campus Community*, *The Copyright Primer*, and the Fair Use law, available at the library. The process of obtaining copyright permission will be facilitated by the bookstore, utilizing a copyright clearing house. It is the instructor's responsibility to prepare all information regarding the origin of the copyrighted material. Noel Andrews, in the bookstore, will be happy to assist you if you if you have any questions.

- **Any material not written by the SMC instructor must have copyright permission to be reproduced.**

- In order for copyright permission to be obtained, you must fill out a copyright application form for each copyright source included in your document.

  You will need to provide the following information for each source:

  Author (book or periodical)
  Title, Edition and Volume #
  Title of Article, Chapter, Etc.
  ISBN# (found on verso of the title page)
  Publisher
  Copyright Date

- The process of obtaining copyright permission will begin when the completed copyright application forms are returned to the bookstore. While in most cases permission is granted, the bookstore can not guarantee approval.

- Copyright permission takes approximately 6 to 8 weeks to be granted.

- Materials and completed forms need to be submitted to the bookstore at least 6 weeks before they are needed for classroom use.

- A credit line must be added to the copyrighted material in the course packet, and should include tittle, author, copyright line (copyright date and claimant) as it appears in the book/journal, and publisher; and should indicate that the material is reproduced by permission of the publisher.

- The selling price of the document includes all costs associated with the production and copyright permission.(i.e., copyright processing fees, printing, labor).

DECLARATION OF COPYRIGHT

Every course packet that is reproduced on or off campus and is sold in the Santa Monica College Bookstore must have a "Declaration of Copyright" form signed and on file in the bookstore.

Name of course packet (from title page)_____
(please print)

Name of Instructor_____Department_____
(please print)

_____**This course packet has NO copyrighted material in it.** I understand that I am responsible for revealing all copyrighted sources and take full responsiblity for abiding by all federal copyright laws.

_____**This course packet contains copyrighted material** and I have submitted the proper forms to the bookstore to obtain permission to reproduce.

Signature _____Date_____

SANTA MONICA COLLEGE

SMC/USCCP Custom Publishing
Bibliography Worksheet

If needed, please use this form to list the items you are using in your course packet. Use additinal forms if necessary.

Job Number:_____ Term:_____ Course_____ Instructor:_____
Job Title:_____

Item _____ of _____ Book/Journal Title:_____

Chapter/Article Author:_____ Is this work copyrighted: ❒ Yes ❒ No

Publisher/Copyright Owner: _____ Copyright Date:_____

Journal Volume & Number:_____Book Edition:_____

# of Pages: _____ From: _____ To:_____ ISBN/ISSN:_____

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Publisher/Copyright Owner: _____ Copyright Date:_____

Journal Volume & Number:_____Book Edition_____

# of Pages: _____ From: _____ To:_____ ISBN/ISSN:_____

Item _____ of _____ Book/Journal Title:_____

Chapter/Article Author:_____ Is this work copyrighted: ❒ Yes ❒ No

Publisher/Copyright Owner: _____ Copyright Date:_____

Journal Volume & Number:_____Book Edition_____

# of Pages: _____ From: _____ To:_____ ISBN/ISSN:_____

Item _____ of _____ Book/Journal Title:_____

Chapter/Article Author:_____ Is this work copyrighted: ❒ Yes ❒ No

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APPENDIX H:

FAIR USE GUIDELINES FOR EDUCATIONAL MULTIMEDIA

FAIR USE GUIDELINES FOR EDUCATIONAL MULTIMEDIA

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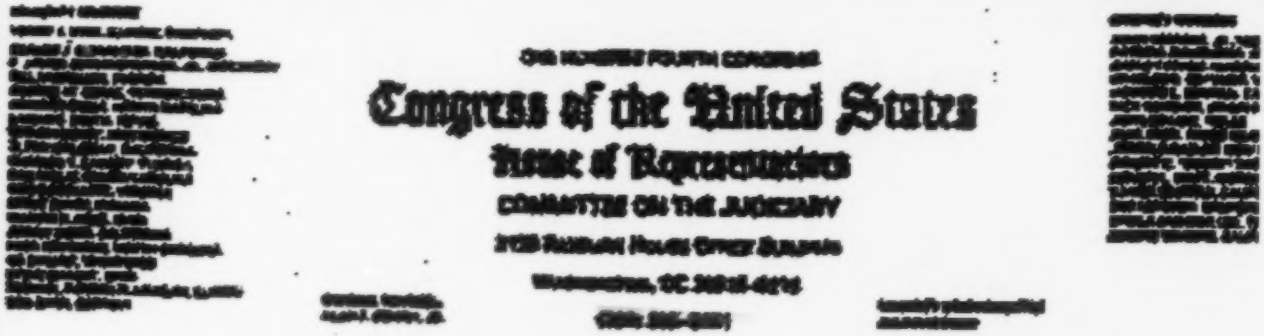

ONE HUNDRED FOURTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON THE JUDICIARY

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NONLEGISLATIVE REPORT OF THE SUBCOMMITTEE ON COURTS AND INTELLECTUAL PROPERTY COMMITTEE ON THE JUDICIARY US HOUSE OF REPRESENTATIVES

This nonlegislative report was adopted by the Subcommittee on Courts and Intellectual Property, Committee on the Judiciary, U. S. House of Representatives, on September 27, 1996, and related to Fair Use Guidelines for Educational Multimedia.

Under the Copyright Act of 1976, copyright owners have the exclusive right to reproduce, prepare derivative works, distribute, perform, display, transfer ownership, rent or lend their creations. Under the same Act, the "fair use" exemption places a limit on these exclusive rights to promote free speech, learning, scholarly research and open discussion. Accordingly, under the Act, educators may use portions of copyrighted material if the purpose and character of the use is educational in nature, previously published, not a substantial part of the entire work and if the marketability of the work is not impaired by the use. These vague standards do not provide much specific guidance for educators, scholars and students, and are fairly subjective in their interpretation.

Because of the vague nature of the exemption, shortly after Congress passed the Copyright Act in 1976, a group of publishers, authors and educators gathered to agree on an interpretation of the fair use exemption which would in turn provide more specific guidelines that educators could follow and be reasonably sure that they would not be in violation of the copyright law. These guidelines were made part of the Congressional Record and became an unrelated part of a Judiciary Committee Report.

Many technological developments have occurred since 1976. The fair use exemption contained in the Copyright Act must again be interpreted by copyright owners and the educational community to allow educators to apply the Act in light of these new technologies. To that end, the Consortium of College and University Media Centers ("CCUMC") convened a diverse group of interested parties to draft guidelines which would provide guidance on the application of the fair use exemption by educators, scholars and students in creating multimedia projects that include portions of copyrighted works, for their use in noncommercial educational activities, without having to seek the permission of copyright owners. These guidelines form the body of this nonlegislative report.

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These guidelines do not represent a legal document, nor are they legally binding. They do represent an agreed upon interpretation of the fair use provisions of the Copyright Act by the overwhelming majority of institutions and organizations affected by educational multimedia. A list of those organizations who have supplied written endorsements for the guidelines appears at the end of the guidelines.

While only the courts can decide whether a particular use of a copyrighted work falls within the fair use exemption, these guidelines represent the participants' consensus view of what constitutes the fair use of a portion of a work which is included in a multimedia educational project. The specific portion and time limitations will help educators, scholars and students more easily identify whether using a portion of a certain copyrighted work in their multimedia program constitutes a fair use of that work. They grant a relative degree of certainty that a use within the guidelines will not be perceived as an infringement of the Copyright Act by the endorsing copyright owners, and that permission for such use will not be required. The more one exceeds these guidelines, the greater the risk that the use of a work is not a fair use, and that permission must be sought.

Along with the Copyright Office and the U. S. Patent and Trademark Office, whose letters of endorsement for these guidelines are included in this report, the Subcommittee congratulates the CCUMC and the other drafting participants for their hard work and effort, which clearly advances the strength of the U. S. copyright system.

Sincerely,

CARLOS J. MOORHEAD
Chairman

PATRICIA SCHROEDER
Ranking Democratic Member

The Register of Copyrights

of the

United States of America

September 4, 1996

Library of Congress

Department 17

Washington, D.C. 20540

Dear Lisa and Ivan:

First, congratulations on completing a most difficult and important project - namely the creation of new fair use guidelines for the creation of multimedia projects by educators and students who use portions of lawfully acquired copyrighted works. The Consortium of College and University Media Centers (CCUMC) deserves a great deal of credit for its efforts in initiating as well as coordinating the process of lengthy negotiations that have led to the "Educational Multimedia Fair Use Guidelines."

I also congratulate the participating organizations and their representatives for their efforts and for the

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compromises they made. I include Mary Levering, Associate Register for National Copyright Programs, who served as a resource person in all the discussions and negotiations over the past two years. I know you found her contributions extremely helpful, and the Copyright Office was pleased to assist in this way.

I believe that experience has demonstrated that guidelines do assist organizations and individuals who wish to comply with the copyright law, and these new multimedia guidelines should be most helpful to educators and educational institutions as they use new technology for teaching and learning purposes.

As you know the Copyright Office is the office charged with the administration of the copyright law; to that end, we register claims to copyright and record documents as well as collect and distribute statutory license fees and oversee the copyright arbitration royalty panels. The Office also provides information services to the public and technical assistance to the Congress and the Executive Branch agencies. As such, we cannot formally endorse guidelines. Nevertheless, I believe you know how we feel about them - we brought your efforts to the attention of Congressional leaders and urged inclusion of the adopted multimedia guidelines in a appropriate Judiciary Committee report.

I wish you well in your continued efforts.

Sincerely,

Marybeth Peters Register of Copyrights

United States Department of Commerce

Patent and Trademark Office

Assistant Secretary and Commissioner

of Patents and Trademarks

Washington, DC 20231

August 21, 1996

Ivan R. Bender, Esq.
Attorney at Law
3442 North Hoyne Avenue
Chicago, IL 60618

Dear Mr. Bender:
Thank you for your letter dated July 23, 1996, and the Fair Use Guidelines for Educational Multimedia enclosed therein.

I am delighted that the hard work and diligence of the Consortium of College and University Media Centers (CCUMC) has produced widely adaptable voluntary guidelines. The drafting, and now the endorsement of such guidelines by major players in the user and content provider communities, are very major accomplishments and clearly represent a significant contribution to the overall effort of establishing voluntary guidelines for fair use of digital works in general. With such guidelines adopted by CCUMC, the goal of the Conference on Fair Use, of which CCUMC had been so supportive, has clearly been advanced.

I am encouraged by and supportive of your efforts to submit the guidelines to Congress for attachment to appropriate legislation. I will be encouraging CONFU to do likewise with the guidelines drafted and adopted through that process. I also appreciate your support for the National Information Infrastructure legislation and I look forward to its timely passage.

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If I can be of any further assistance in this matter, please do not hesitate to contact my office.

Sincerely,

Bruce A. Lehman
Assistant Secretary of Commerce and Commissioner of Patents and Trademarks

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FAIR USE GUIDELINES FOR EDUCATIONAL MULTIMEDIA*

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1. INTRODUCTION

1.1 Preamble

Fair use is a legal principle that defines the limitations on the exclusive rights** of copyright holders. The purpose of these guidelines is to provide guidance on the application of fair use principles by educators, scholars and students who develop multimedia projects using portions of copyrighted works under fair use rather than by seeking authorization for non-commercial educational uses. These guidelines apply only to fair use in the context of copyright and to no other rights.

There is no simple test to determine what is fair use. Section 107 of the Copyright Act*** sets forth the four fair use factors which should be considered in each instance, based on particular facts of a given case, to determine whether a use is a "fair use": (1) the purpose and character of use, including whether such use is of a commercial nature or is for nonprofit educational purposes, (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (4) the effect of the use upon the potential market for or value of the copyrighted work.

While only the courts can authoritatively determine whether a particular use is fair use, these guidelines represent the endorsers' consensus of conditions under which fair use should generally apply and examples of when permission is required.. Uses that exceed these guidelines may nor may not be fair use. The participants also agree that the more one exceeds these guidelines, the greater the risk that fair use does not apply.

The limitations and conditions set forth in these guidelines do not apply to works in the public domain--such as U.S. Government works or works on which copyright has expired for which there are no copyright restrictions--or to works for which the individual or institution has obtained permission for the particular use. Also, license agreements may govern the uses of some works and users should refer to the applicable license terms for guidance.

The participants who developed these guidelines met for an extended period of time and the result represents their collective understanding in this complex area. Because digital technology is in a dynamic phase, there may come a time when it is necessary to review the guidelines. Nothing in these guidelines

shall be construed to apply to the fair use privilege in any context outside of educational and scholarly uses of educational multimedia projects.

This Preamble is an integral part of these guidelines and should be included whenever the guidelines are reprinted or adopted by organizations and educational institutions. Users are encouraged to reproduce and distribute these guidelines freely without permission; no copyright protection of these guidelines is claimed by any person or entity.

*These Guidelines shall not be read to supersede other preexisting education fair use guidelines that deal with the Copyright Act of 1976.
**See Section 106 of the Copyright Act.
***The Copyright Act of 1976, as amended, is codified at 17 U.S.C. Sec.101 et seq.
guidelines and clearly indicate the variety of interest groups involved, both from the standpoint of the users of copyrighted material and also from the standpoint of the copyright owners.

1.2 Background

These guidelines clarify the application of fair use of copyrighted works as teaching methods are adapted to new learning environments. Educators have traditionally brought copyrighted books, videos, slides, sound recordings and other media into the classroom, along with accompanying projection and playback equipment. Multimedia creators integrated these individual instructional resources with their own original works in a meaningful way, providing compact educational tools that allow great flexibility in teaching and learning. Material is stored so that it may be retrieved in a nonlinear fashion, depending on the needs or interests of learners. Educators can use multimedia projects to respond spontaneously to students' questions by referring quickly to relevant portions. In addition, students can use multimedia projects to pursue independent study according to their needs or at a pace appropriate to their capabilities. Educators and students want guidance about the application of fair use principles when creating their own multimedia projects to meet specific instructional objectives.

1.3 Applicability of These Guidelines

(Certain basic terms used throughout these guidelines are identified in bold and defined in this section.)

These guidelines apply to the use, without permission, of portions of lawfully acquired copyrighted works in educational multimedia projects which are created by educators or students as part of a systematic learning activity by nonprofit educational institutions. **Educational multimedia projects** created under these guidelines incorporate students' or educators' original material, such as course notes or commentary, together with various copyrighted media formats including but not limited to, motion media, music, text material, graphics, illustrations, photographs and digital software which are combined into an integrated presentation. **Educational institutions** are defined as nonprofit organizations whose primary focus is supporting research and instructional activities of educators and students for noncommercial purposes.

For the purposes of the guidelines, **educators** include faculty, teachers, instructors, and others who engage in scholarly, research and instructional activities for educational institutions. The copyrighted works used under these guidelines are **lawfully acquired** if obtained by the institution or individual through lawful means such as purchase, gift or license agreement but not pirated copies. Educational multimedia projects which incorporate portions of copyrighted works under these guidelines may be used only for **educational purposes** in systematic learning activities including use in connection with non-commercial curriculum-based learning and teaching activities by educators to students enrolled in courses at nonprofit educational institutions or otherwise permitted under Section 3. While these guidelines refer to the creation and use of educational multimedia projects, readers are advised that in some instances other fair use guidelines such as those for off-air taping may be relevant.

2. PREPARATION OF EDUCATIONAL MULTIMEDIA PROJECTS USING PORTIONS OF

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COPYRIGHTED WORKS
These uses are subject to the Portion Limitations listed in Section 4. They should include proper attribution and citation as defined in Sections 6.2.

2.1 By students:
Students may incorporate portions of lawfully acquired copyrighted works when producing their own educational multimedia projects for a specific course.

2.2 By Educators for Curriculum-Based Instruction:
Educators may incorporate portions of lawfully acquired copyrighted works when producing their own educational multimedia programs for their own teaching tools in support of curriculum-based instructional activities at educational institutions.

3. PERMITTED USES OF EDUCATIONAL MULTIMEDIA PROGRAMS CREATED UNDER THESE GUIDELINES
Uses of educational multimedia projects created under these guidelines are subject to the Time, Portion, Copying and Distribution Limitations listed in Section 4.

3.1 Student Use:
Students may perform and display their own educational multimedia projects created under Section 2 of these guidelines for educational uses in the course for which they were created and may use them in their own portfolios as examples of their academic work for later personal uses such as job and graduate school interviews

3.2 Educator Use for Curriculum-Based Instruction:
Educators may perform and display their own educational multimedia projects created under Section 2 for curriculum-based instruction to students in the following situations:

3.2.1 for face-to-face instruction,

3.2.2 assigned to students for directed self-study,

3.2.3 for remote instruction to students enrolled in curriculum-based courses and located at remote sites, provided over the educational institution's secure electronic network in real-time, or for after class review or directed self-study, provided there are technological limitations on access to the network and educational multimedia project (such as a password or PIN) and provided further that the technology prevents the making of copies of copyrighted material.

If the educational institution's network or technology used to access the educational multimedia project created under Section 2 of these guidelines cannot prevent duplication of copyrighted material, students or educators may use the multimedia educational projects over an otherwise secure network for a period of only 15 days after its initial real-time remote use in the course of instruction or 15 days after its assignment for directed self-study. After that period, one of the two use copies of the educational multimedia project may be placed on reserve in a learning resource center, library or similar facility for on-site use by students enrolled in the course. Students shall be advised that they are not permitted to make their own copies of the multimedia project.

3.3 Educator Use for Peer Conferences:
Educators may perform or display their own multimedia projects created under Section 2 of these guidelines in presentations to their peers, for example, at workshops and conferences.

3.4 Educator Use for Professional Portfolio
Educators may retain educational multimedia projects created under Section 2 of these guidelines in their personal portfolios for later personal uses such as tenure review or job interviews.

4. LIMITATIONS--TIME, PORTION, COPYING AND DISTRIBUTION

The preparation of educational multimedia projects incorporating copyrighted works under Section 2, and the use of such projects under Section 3, are subject to the limitations noted below.

4.1 Time Limitations

Educators may use their educational multimedia projects created for educational purposes under Section 2 of these guidelines for teaching courses, for a period of up to two years after the first instructional use with a class. Use beyond that time period, even for educational purposes, requires permission for each copyrighted portion incorporated in the production. Students may use their educational multimedia projects as noted in Section 3.1.

4.2 Portion Limitations

Portion limitations mean the amount of a copyrighted work that can reasonably be used in educational multimedia projects under these guidelines regardless of the original medium from which the copyrighted works are taken. **In the aggregate** means the total amount of copyrighted material from a single copyrighted work that is permitted to be used in an educational multimedia project without permission under these guidelines. These limits apply cumulatively to each educator's or student's multimedia project(s) for the same academic semester, cycle or term. All students should be instructed about the reasons for copyright protection and the need to follow these guidelines. It is understood, however, that students in kindergarten through grade six may not be able to adhere rigidly to the portion limitations in this section in their independent development of educational multimedia projects. In any event, each such project retained under Sections 3.1 and 4.3 should comply with the portion limitaitons in this section.

4.2.1 Motion Media

Up to 10% or 3 minutes, whichever is less, in the aggregate of a copyrighted motion media work may be reproduced or otherwise incorporated as part of a multimedia project created under Section 2 of these guidelines.

4.2.2 Text Material

Up to 10% or 1000 words, whichever is less, in the aggregate of a copyrighted work consisting of text material may be reproduced or otherwise incorporated as part of a multimedia project created under Section 2 of these guidelines. An entire poem of less than 250 words may be used, but no more than three poems by one poet, or five poems by different poets from any anthology may be used. For poems of greater length, 250 words may be used but no more than three excerpts by a poet, or five excerpts by different poets from a single anthology may be used.

4.2.3 Music, Lyrics, and Music Video

Up to 10%, but in no event more than 30 seconds, of the music and lyrics from an individual musical work (or in the aggregate of extracts from an individual work), whether the musical work is embodied in copies, or audio or audiovisual works, may be reproduced or otherwise incorporated as a part of a multimedia project created under Section 2. Any alterations to a musical work shall not change the basic melody or the fundamental character of the work.

4.2.4 Illustrations and Photographs

The reproduction or incorporation of photographs and illustrations is more difficult to define with regard to fair use because fair use usually precludes the use of an entire work. Under these guidelines a photograph or illustration may be used in its entirety but no more than 5 images by an artist or photographer may be reproduced or otherwise incorporated as part of an educational multimedia project created under Section 2. When using photographs and illustrations from a published collective work, not more than 10% or 15 images, whichever is less, may be reproduced or otherwise incorporated as part of an educational multimedia project created under Section 2.

4.2.5 Numerical Data Sets

Up to 10% or 2500 fields or cell entries, whichever is less, from a copyrighted database or data table may be reproduced or otherwise incorporated as part of a educational multimedia project created under

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Section 2 of these guidelines. A field entry is defined as a specific item of information, such as a name or Social Security number, in a record of a database file. A cell entry is defined as the intersection where a row and a column meet on a spreadsheet.

4.3 Copying and Distribution Limitations

Only a limited number of copies, including the original, may be made of an educator's educational multimedia project. For all of the uses permitted by Section 3, there may be no more than two use copies only one of which may be placed on reserve as described in Section 3.2.3.

An additional copy may be made for preservation purposes but may only be used or copied to replace a use copy that has been lost, stolen, or damaged. In the case of a jointly created educational multimedia project, each principal creator may retain one copy but only for the purposes described in Sections 3.3 and 3.4 for educators and Section 3.1 for students.

5. EXAMPLES OF WHEN PERMISSION IS REQUIRED

5.1 Using Multimedia Projects for Non-Educational or Commercial Purposes

Educators and students must seek individual permissions (licenses) before using copyrighted works in educational multimedia projects for commercial reproduction and distribution.

5.2 Duplication of Multimedia Projects Beyond Limitations Listed in These Guidelines

Even for educational uses, educators and students must seek individual permissions for all copyrighted works incorporated in their personally created educational multimedia projects before replicating or distributing beyond the limitations listed in Section 4.3.

5.3 Distribution of Multimedia Projects Beyond Limitations Listed in These Guidelines

Educators and students may not use their personally created educational multimedia projects over electronic networks, except for uses as described in Section 3.2.3, without obtaining permissions for all copyrighted works incorporated in the program.

6. IMPORTANT REMINDERS

6.1 Caution in Downloading Material from the Internet

Educators and students are advised to exercise caution in using digital material downloaded from the Internet in producing their own educational multimedia projects, because there is a mix of works protected by copyright and works in the public domain on the network. Access to works on the Internet does not automatically mean that these can be reproduced and reused without permission or royalty payment and, furthermore, some copyrighted works may have been posted to the Internet without authorization of the copyright holder.

6.2 Attribution and Acknowledgement

Educators and students are reminded to credit the sources and display the copyright notice © and copyright ownership information if this is shown in the original source, for all works incorporated as part of the educational multimedia projects prepared by educators and students, including those prepared under fair use. Crediting the source must adequately identify the source of the work, giving a full bibliographic description where available (including author, title, publisher, and place and date of publication). The copyright ownership information includes the copyright notice (©, year of first publication and name of the copyright holder).

The credit and copyright notice information may be combined and shown in a separate section of the educational multimedia project (e.g. credit section) except for images incorporated into the project for the uses described in Section 3.2.3. In such cases, the copyright notice and the name of the creator of the image must be incorporated into the image when, and to the extent, such information is reasonably available; credit and copyright notice information is considered "incorporated" if it is attached to the image file and appears on the screen when the image is viewed. In those cases when displaying source credits and copyright ownership information on the screen with the image would be mutually exclusive

with an instructional objective (e.g. during examinations in which the source credits and/or copyright information would be relevant to the examination questions), those images may be displayed without such information being simultaneously displayed on the screen. In such cases, this information should be linked to the image in a manner compatible with such instructional objectives.

6.3 Notice of Use Restrictions

Educators and students are advised that they must include on the opening screen of their multimedia program and any accompanying print material a notice that certain materials are included under the fair use exemption of the U.S. Copyright Law and have been prepared according to the multimedia fair use guidelines and are restricted from further use.

6.4 Future Uses Beyond Fair Use

Educators and students are advised to note that if there is a possibility that their own educational multimedia project incorporating copyrighted works under fair use could later result in broader dissemination, whether or not as commercial product, it is strongly recommended that they take steps to obtain permissions during the development process for all copyrighted portions rather than waiting until after completion of the project.

6.5 Integrity of Copyrighted Works: Alterations

Educators and students may make alterations in the portions of the copyrighted works they incorporate as part of an educational multimedia project only if the alterations support specific instructional objectives. Educators and students are advised to note that alterations have been made.

6.6 Reproduction or Decompilation of Copyrighted Computer Programs

Educators and students should be aware that reproduction or decompilation of copyrighted computer programs and portions thereof, for example the transfer of underlying code or control mechanisms, even for educational uses, are outside the scope of these guidelines.

6.7 Licenses and Contracts

Educators and students should determine whether specific copyrighted works, or other data or information are subject to a license or contract. Fair use and these guidelines shall not preempt or supersede licenses and contractual obligations.

APPENDIX A: (as of MARCH 19, 1997)

1. ORGANIZATIONS THAT HAVE ENDORSED THESE GUIDELINES:

Agency for Instructional Technology (AIT)
American Association of Community Colleges (AACC)
American Society of Journalists and Authors (ASJA)
American Society of Media Photographers, Inc. (ASMP)
American Society of Composers, Authors and Publishers (ASCAP)
Association for Educational Communications and Technology (AECT)
Association for Information Media and Equipment (AIME)
Association of American Publishers (AAP)*
Association of American Colleges and Universities (AAC&U)
Association of American University Presses, Inc. (AAUP)
Broadcast Music, Inc. (BMI)
Consortium of College and University Media Centers (CCUMC)
Creative Incentive Coalition (CIC)**
DeKalb College/Clarkston, GA
Educational Technology Officers' Association of the State University of New York (EdTOA/SUNY)
Educational Testing Service (ETS)
Iowa Association for Communications Technology (IACT)

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Information Industry Association (IIA)
Instructional Telecommunications Council (ITC)
Maricopa Community Colleges/Phoenix
Motion Picture Association of America (MPAA)
Music Publishers' Association of the United States (MPA)
National Association of Regional Media Centers (NARMC)
National Association of Schools of Art and Design
National Association of Schools of Dance
National Association of Schools of Music (NASM)
Recording Industry Association of America (RIAA)
Special Libraries Association (SLA)
Software Publishers Association (SPA)
Tennessee Board of Regents Media Consortium

2. U.S. GOVERNMENT AGENCIES SUPPORTING THESE GUIDELINES:
U.S. National Endowment for the Arts (NEA)
U.S. Copyright Office
U.S. Patent and Trademark Office

3. INDIVIDUAL COMPANIES AND INSTITUTIONS ENDORSING THESE GUIDELINES:
Houghton-Mifflin
John Wiley & Sons, Inc.
McGraw-Hill
Time Warner, Inc.

**** ADDITIONAL INFORMATION ON SOME OF THE ORGANIZATIONS WHO HAVE ENDORSED THESE GUIDELINES**

The Association of American Publishers (AAP) membership includes over 200 publishers.

The Information Industry Association (IIA) membership includes 550 companies involved in the creation, distribution and use of information products, services and technologies.

The Software Publishers Association (SPA) membership includes 1200 software publishers.

****The Creative Incentive Coalition membership includes the following organizations:**
--Association of American Publishers
--Association of Independent Television Stations
--Association of Test Publishers
--Business Software Alliance
--General Instrument Corporation
--Information Industry Association
--Information Technology Industry Council
--Interactive Digital Sofware Association
--Magazine Publishers of America
--The McGraw-Hill Companies
--Microsoft Corporation
--Motion Picture Association of America, Inc.
--National Cable Television Association
--National Council of Teachers of Mathematics
--National Music Publisher's Association
--Newspaper Association of America
--Recoding Industry Association of America

--Seagram/MCA, Inc.
--Software Publishers Association
--Time Warner, Inc.
--Turner Broadcasting System, Inc.
--West Publishing Company
--Viacom, Inc.

APPENDIX B: ORGANIZATIONS PARTICIPATING IN GUIDELINE DEVELOPMENT: Being a participant does not necessarily mean that the organization has or will endorse these guidelines.

Agency for Instructional Technology (AIT)
American Association of Community Colleges (AACC)
American Association of Higher Education (AAHE)
American Library Association (ALA)
American Society of Journal Authors, Inc. (ASJA)
American Society of Media Photographers (ASMP)
Artists Rights Foundation
Association of American Colleges and Universities (AAC&U)
Association of American Publishers (AAP)
--Harvard University Press
--Houghton Mifflin
--McGraw-Hill
--Simon and Schuster
--Worth Publishers
Association of College Research Libraries (ACRL)
Association for Educational Communications and Technology (AECT)
Association for Information Media and Equipment (AIME)
Association of Research Libraries (ARL)
Authors Guild, Inc.
Broadcast Music, Inc. (BMI)
Consortium of College and University Media Centers (CCUMC)
Copyright Clearance Center (CCC)
Creative Incentive Coalition (CIC)
Directors Guild of America (DGA)
European American Music Distributors Corp.
Educational institution represented
--American University
--Carnegie Mellon University
--City College/City University of New York
--Kent State University
--Maricopa Community Colleges/Phoenix
--Penn State University
--University of Delaware
Information Industry Association (IIA)
Instructional Telecommunications Council (ITC)
International Association of Scientific, Technical and Medical Publishers
Motion Picture Association of America (MPAA)
Music Publishers Association (MPA)
National Association of State Universities and Land-Grant Colleges (NASULGC)
National Council of Teachers of Mathematics (NCTM)
National Educational Association (NEA)
National Music Publishers Association (NMPA)
National School Boards Association (NSBA)

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National Science Teachers Association (NSTA)
National Video Resources (NVR)
Public Broadcasting System (PBS)
Recording Industry Association of America (RIAA)
Software Publishers Association (SPA)
Time-Warner, Inc.
U.S. Copyright Office
U.S. National Endowment for the Arts (NEA)
Viacom, Inc.

Prepared by the Educational Multimedia Fair Use Guidelines Development Committee, July 17, 1996

http://www.libraries.psu.edu/avs/fairuse/guidelinesdoc.html

APPENDIX I:

THE CONFERENCE ON FAIR USE

THE CONFERENCE ON FAIR USE

REPORT TO THE COMMISSIONER ON THE CONCLUSION OF THE FIRST PHASE OF THE CONFERENCE ON FAIR USE

BRUCE A. LEHMAN
ASSISTANT SECRETARY OF COMMERCE AND COMMISSIONER OF PATENTS AND TRADEMARKS AND CHAIR, WORKING GROUP ON INTELLECTUAL PROPERTY RIGHTS OF THE INFORMATION INFRASTRUCTURE TASK FORCE

SEPTEMBER 1997

Single copies of this Report, as well as the Interim Report of December 1996, may be obtained, free of charge, by sending or faxing a written request to:

CONFU Report
c/o Richard Maulsby, Director
Office of Public Affairs
U.S. Patent and Trademark Office
Washington, DC 20231
fax: (703) 308-5258

INTRODUCTION

In 1993, President Clinton formed the Information Infrastructure Task Force (IITF) to articulate and implement the Administration's vision for the National Information

Infrastructure (NII), and established the U.S. Advisory Council on the National Information Infrastructure within the Department of Commerce to advise the Secretary of Commerce on a national strategy for promoting the development of the NII.[1] The IITF is chaired by the Secretary of Commerce and consists of high-level representatives of the Federal agencies that play a role in advancing the development and application of information technologies. Guided by the principles for government action described in *NII Agenda for Action*[2] and *GII Agenda for Cooperation*[3], the participating agencies worked with the private sector, public interest groups, Congress, and State and local governments to develop comprehensive telecommunications and information policies and programs that will promote the development of the NII and best meet the needs of the country.

The IITF is organized into three committees: the Telecommunications Policy Committee, the Committee on Applications and Technology, and the Information Policy Committee. The Working Group on Intellectual Property Rights (hereinafter "Working Group"), chaired by Assistant Secretary of Commerce and Commissioner of Patents and Trademarks Bruce A. Lehman, was established within the Information Policy Committee to examine the intellectual property implications of the NII and to make recommendations on any appropriate changes to U.S. intellectual property law and policy.[4]

Following a public hearing in November 1993[5], and review and analysis of both the solicited written comments and the extensive number of public comments that were submitted, the Working Group released a preliminary draft of its report (hereinafter "Green Paper") on July 7, 1994.[6] Following release of the Green Paper, the Working Group heard testimony from the public in four days of hearings in Chicago, Los Angeles, and Washington, D.C., in September 1994.[7]

The Green Paper expressed significant concerns with the ability of the limitations on copyright owners' exclusive rights, particularly those contained in the fair use provisions of the Copyright Act, to provide the public with adequate access to copyrighted works transmitted digitally.[8] While recognizing that those principles underlying the guidelines for library and educational use of printed matter and music should still apply, the Working Group believed it would be "difficult and, perhaps, inappropriate, to apply the specific language of some of those guidelines in the context of digital works and on-line services." [9]

The Working Group decided to convene a Conference on Fair Use (CONFU) to bring together copyright owner and user interests to discuss fair use issues and, if appropriate and feasible, to develop guidelines for fair uses of copyrighted works by librarians and educators.[10] At the time of issuance of the Report of the Working Group on Intellectual Property Rights (hereinafter "White Paper")[11],

in September 1995, CONFU was still meeting and had not concluded its work.

Meeting regularly in public sessions, CONFU grew from the forty groups which were invited to participate in the first meeting on September 21, 1994, to the approximately one hundred organizations participating as of May 1997.[12] Since 1994, the Working Group has facilitated plenary session meetings and coordinated the flow of information for CONFU.[13] A five-person Steering Committee, selected in September 1994 by all CONFU participants, acted as the formal structure guiding the CONFU process.[14]

BACKGROUND

As the White Paper noted, "intellectual property is a subtle and esoteric area of the law that evolves in response to technological change." [15] The Copyright Act[16] was enacted in response to "significant changes in technology [that had] affected the operation of the copyright law." [17] It specifies that certain uses of copyrighted works are outside the control of the copyright owner, and it provides a number of exceptions to the "exclusive" rights of copyright owners. While many regard these exceptions as rights of users, they are, technically, outright exemptions from liability or affirmative defenses to what would otherwise be acts of infringement.

The most significant and, perhaps, murky of the limitations on a copyright owner's exclusive rights is the doctrine of fair use. [18] Though now embodied in statutory language, the doctrine of fair use is rooted in more than 200 years of judicial decisions. Fair use is an affirmative defense to an action for copyright infringement. It is potentially available with respect to all manner of unauthorized uses of all types of works in all media. When the fair use doctrine applies to a specific use of a work, the person making fair use of the work does not need to seek permission from the copyright owner or to compensate the copyright owner for the use of the work.

Before examining the work of CONFU, it is useful to examine the statutory language concerning fair use. Section 107 of the Copyright Act provides:

Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted

work, including such use by reproduction in copies or phonorecords or by any other means specified by that section [sic], for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include --

(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;

(2) the nature of the copyrighted work;

(3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and

(4) the effect of the use upon the potential market for or value of the copyrighted work.

The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.[19]

The copyright law allows copyright owners to exercise the rights granted to them, to license their rights, or to give them away. Some copyright owners are not motivated by any commercial considerations. Those creators and authors who wish to dedicate their works to the public domain may, of course, do so notwithstanding the availability of protection under the Copyright Act. Nothing in the law prevents those who do not wish to claim copyright from waiving their rights and allowing unrestricted reproduction, distribution and other uses of their works. As the White Paper notes, "[c]opyright protection is not an obstacle in the way of the success of the NII; it is an essential component. Effective copyright protection is a fundamental way to promote the availability of works to the public." [20]

While the NII and other digital technology present myriad opportunities for fair uses of works,

[i]t is reasonable to expect that courts would approach claims of fair use in the context of the NII just as they do in 'traditional' environments. Commercial uses that involve no 'transformation' by users and harm actual or potential markets will likely always be infringing, while non-profit educational transformative uses will likely often be fair. Between these two extremes, courts will have to engage in the same type of fact-intensive analysis that typifies fair use litigation and frustrates those who seek a 'bright line' clearly separating the lawful from the unlawful.[21]

Given the lack of such "bright lines", interested parties, including the user communities, copyright owners, and those who act in an intermediary role, such as libraries, educators, and publishers, have over the years developed voluntary guidelines to

address practical use situations. The fair use[22], library copying[23], and educational use[24] provisions of the Copyright Act have been the subject of four sets of guidelines for libraries and educational institutions, to which affected parties have agreed. These various guidelines, while having no force of law, are contained at different places in legislative history. The current guidelines cover certain copying by and for teachers in the classroom context[25], the copying of music for educational purposes[26], the copying of relatively recent journal articles by one library for a patron of another[27], and the off-air videotaping of educational broadcast materials.[28] The result has been, in certain circumstances, a quantitative gloss on the construction of fair use and library copying privileges.

I. THE CONFU PROCESS

The genesis of CONFU was the Green Paper's call for a "conference to bring together copyright owner and user interests to develop guidelines for fair uses of copyrighted works by and in public libraries and schools." [29] Some forty organizations representing copyright owners, educators, and librarians were invited to submit statements that identified the issues that they believed CONFU should address, and that set out no more than three principles that participants believed should apply to educational and library fair use in the digital context.[30] These statements were distributed to all participants and discussion of the proposed principles occurred at the first session of CONFU on September 21, 1994. The participants' proposed principles were subsequently grouped into several categories: fair use in general, policy concerns, media application, marketplace, licensing/transaction tracking, new guideline concerns, and browsing.[31]

Participants were encouraged to follow the example of previous successful efforts to develop voluntary fair use guidelines -- the Classroom Guidelines in 1976,[32] and the National Commission on New Technological Uses of Copyrighted Works (hereinafter "CONTU"), which dealt with the issues raised by photocopiers and computers in 1978.[33]

In addition, there was a recognition that the Consortium of College and University Media Centers (CCUMC), which had convened a working group composed of many of the same participants as CONFU, had begun in June 1994 a process to develop fair use guidelines for educational multimedia uses. While a parallel effort, the CCUMC multimedia working group was open to all CONFU participants, its progress reported at CONFU meetings, and its results, ultimately considered part of the CONFU process, were added to the Report on the Conclusion of the First Phase of CONFU.

At three half-day meetings on October 21, 24, and 26, 1994, there was an initial effort to organize the discussion and work of CONFU by means of subgroupings of

participants into library, elementary-secondary, and higher education subcommittees. These meetings identified a variety of new uses and issues for discussion. However, because they reflected the same copyright owner and user concerns, they crossed all organizational subgroupings; hence, this approach did not prove to be a useful organizing structure. Since individuals had volunteered to present short papers or reports on these discussion issues at future meetings, it was decided, rather, to meet in plenary sessions to hear and discuss the topic presentations. This process began in early December 1994.

The presentation and discussion of these topics laid the foundation for informed discussions prior to participants turning to the subject of drafting various scenarios, and, further, allowed participants to decide which topics should be explored as scenarios and which were useful only as background information. The scenario presentations and discussions allowed participants to decide which topics were appropriate for guidelines, and how to deal with such topics, if at all, in the process of drafting guidelines.

Following presentations on twenty-one different topics,[34] certain topics were selected for discussion of specific scenarios which would provide concrete examples of how schools and libraries might use copyrighted works under fair use and whether such uses were covered by current law. These scenarios, which included distance learning, multimedia, electronic reserves, visually impaired, transient copying, use of software in libraries, preservation, visual image archives, interlibrary loan/document delivery, downloading for personal use, and browsing,[35] provided a range of examples of what, in the opinions of the drafters of the scenarios, may or may not be considered fair use or, in the case of interlibrary loans, guidelines for Section 108. Subsequently, following further sessions devoted to topic and scenario discussions, and as a result of the extensive background discussions at monthly sessions, six working groups,[36] with various representatives of rightsholders and educational and library users as participants, emerged to draft and negotiate fair use guidelines in five specific areas. A Statement of Scenarios on the use of copyrighted computer software in libraries was also created.

These working groups met and negotiated throughout 1995 and most of 1996, running contemporaneously with monthly plenary sessions to discuss issues and drafts of voluntary guidelines with the entire group of participants. In addition, a number of individuals and organizations interested in nonprofit music education and music publishing met on April 26, 1996, at Columbia University, under the auspices of CONFU, to discuss whether current guidelines for educational uses of music needed revision in the digital environment.[37] The general consensus was that no change was needed at that time, but that music publishers, music educators, and music librarians

would need to be aware of the guidelines being developed by CONFU, which might include uses of music in digital form.

As progress was being made in some areas and not in others, it was decided at the plenary session meeting on May 30, 1996, that a concerted effort would be made by all working groups to complete, if possible, the drafting of widely acceptable guidelines in light of a general consensus to end the CONFU plenary process by November 30, 1996. The multimedia working group stated at that time that should it reach agreement on fair use multimedia guidelines sooner, it would seek to have such voluntary guidelines included in legislative history.[38]

On May 30, 1996, participants agreed to adopt for all sets of guidelines a Uniform Preamble,[39] which had been drafted and coordinated by Mary Levering, Associate Register for National Copyright Programs in the U.S. Copyright Office. On September 6, 1996, participants agreed that a brief factual report of the CONFU process, including any resultant guidelines, should be prepared with advice and comment from the CONFU Steering Committee. A draft of such a report was circulated by the Steering Committee for comment prior to a plenary session on November 25, 1996. At the meeting on November 25, 1996, a number of revisions to the draft report were suggested and discussed, and it was agreed by the participants that the three sets of guidelines dealing with digital images, distance learning, and educational multimedia, would be attached as appendices to what would now be called an Interim Report. It was agreed that the Interim Report would be circulated as a useful background for those who would now consider the endorsement or non-endorsement of the three sets of guidelines during an agreed to six-month endorsement period, recognizing that the proposed guidelines for digital images and distance learning, unlike those for educational multimedia, were completed only a short time prior to the meeting and might possibly be revised at some point in the future as the working groups may determine appropriate.

The Interim Report was published in early January 1997, in both hard copy and electronic form, and it was made available on numerous websites, including the official U.S. Patent and Trademark Office website.[40] Following an extended period for discussion and consideration of the proposals for guidelines, CONFU participants met on May 19, 1997, to consider the degree to which the three proposals for guidelines had gained acceptance and endorsement among the copyright owner and user communities as reflected in comments and statements received by the CONFU facilitator. It was determined that a report, which would update the Interim Report as to the status of CONFU and the results achieved to date, be drafted and published in recognition of what was viewed by many as the conclusion of the first phase of the Conference of Fair Use. Participants were given until June 30, 1997, to submit to the facilitator any formal or revised statements or comments of their position on the three

sets of guidelines, with such submissions to be included in the aforementioned report, as well as, posted on the U.S. Patent and Trademark Office website.[41]

In recognition of the need for continued work and discussion on some of the guidelines, as well as the desire of most participants to continue a forum for dialogue on other fair use issues, it was the consensus of the participants that CONFU would reconvene a meeting on May 18, 1998. The purpose of the meeting would be to assess the status of the three sets of guidelines, to take reports on the work of the remaining working groups on digital images and distance learning, and to assess the progress, if any, toward achieving greater acceptance, endorsement, and implementation of the various sets of guidelines within the copyright owner and user communities.

II. STATUS OF THE GUIDELINES

Following what amounted to an intensive self-education process by CONFU participants, the various working groups, where it proved possible, began the task of discussing and drafting proposed guidelines, often taking months of negotiation on both concepts and language. Some working groups succeeded in drafting proposals for guidelines which were acceptable to a broad range of participants. Others were not as successful in drafting proposals for guidelines acceptable to a broad cross-representative number of CONFU participants. In some areas, participants felt that the time was not yet ripe to write actual guidelines since the technology was still evolving and the marketplace was still experimenting with how to deal with these issues. In other areas, there was no clear consensus on how to draft guidelines, or whether, in some cases, guidelines were even necessary. Some institutions and organizations which participated in CONFU are opposed to one or more of the proposals for guidelines, while others have endorsed some or all of the guidelines. Indeed, at the end of Phase One of the process, some organizations concluded that it was premature to adopt any guidelines at this time. Finally, it was a matter of general agreement by all CONFU participants that the participation by such institutions and organizations in the process of drafting these proposals for guidelines does not assume the endorsement by any of the participating institutions and organizations.

What follows is a summary of the work of the respective working groups on the various proposals for guidelines.

A. DIGITAL IMAGES

It was recognized at the outset of CONFU that digital images collections raise issues different from text issues; that these considerations and concerns were not addressed by text norms and understandings (e.g., quality/distortion/accuracy issues, commercial exploitation potential, and the critical mass necessary for educational uses). Moreover, print issues were well represented within the CONFU process, and, because not much

attention had been paid to the issues regarding images in the old technologies, it was even more difficult to grapple with the issues in the new technologies. These issues were discussed at early CONFU plenary sessions and separately at a College Art Association meeting in April 1995, in New York, convened by Barbara Hoffman, counsel to the College Art Association.

Subsequently, various versions of scenarios and drafts of proposed guidelines were prepared and presented by Barbara Hoffman and discussed at several CONFU plenary sessions. Recognizing the scope of the issues, and the disagreements on threshold understandings of copyright issues relating to digital images, it was recommended at the CONFU plenary session in December 1995, that a more formal CONFU working group, representing both educational users and copyright owners, was needed to review and negotiate the working drafts. After a few sessions in early 1996, it became clear that, in order to make significant progress on the drafting of widely acceptable guidelines, other disciplines, in addition to art history and art scholarship, needed to be represented in the working group in order to represent broader interests and concerns regarding educational fair use of digital images.

Drawing also on representative parties from the scientific, biomedical, and mathematics communities, the Digital Images Working Group was reorganized under the leadership of Patricia Williams, Vice President of Policy and Program of the American Association of Museums, with the assistance of Anita DiFanis, Director of Government Affairs of the Association of Art Museum Directors, and others, including, Mary B. Levering, Associate Register for National Copyright Programs of the U.S. Copyright Office, Library of Congress, Hope O'Keeffe, Deputy General Counsel of the National Endowment for the Arts, and Victor S. Perlman, General Counsel of the American Society of Media Photographers, with more than twenty participating organizations providing support and guidance to this expanded process. This expanded effort led to new Educational Fair Use Guidelines for Digital Images being drafted with input from the copyright owner and user communities. The purpose of the Guidelines is to clarify the application of the fair use doctrine as it relates to the creation of digital archives, digital images and their use, for educational purposes, including the digitizing of pre-existing analog image collections and newly acquired analog visual images.

Having completed the drafting process in November 1996, the working group concluded that, while there was no consensus within the working group as to recommending the guidelines for endorsement, there was consensus that the draft guidelines could be disseminated to organizations for review, discussion, and possible endorsement over the next several months. As with other sets of guidelines, participation in the process of drafting these guidelines does not assume the endorsement by any of the participating organizations, and organizations may or may not choose to endorse the digital images guidelines. On November 25, 1996, it was

decided that this proposal would be submitted for consideration as a completed proposal for fair use guidelines for digital images.[42]

Following extensive national discussion and consideration of the proposal for guidelines by many organizations concerned with art education, art history and art preservation, it was apparent at the CONFU meeting on May 19, 1997, that while a number of organizations had endorsed the proposed guidelines and were willing to implement them in order to see if they worked, there was a significant number of organizations that opposed endorsement of the guidelines at this time on the basis that the proposed guidelines were viewed as unworkable. Given that most participants supported the goal of achieving workable guidelines, but acknowledging the lack of consensus on the proposed guidelines, it was proposed that a monitored use period be instituted for at least one year, during which institutions could implement the proposed guidelines and use them in practical classroom and institutional situations.

During this use period, those institutions and organizations which voluntarily implement the guidelines will be asked to provide their observations, comments, and criticisms of the guidelines to the Digital Images Working Group, whose membership has been expanded to include a greater number of educational and academic organizations. The working group will continue to meet periodically to discuss specific problems reported in using the guidelines and to reevaluate the guidelines based on specific concerns expressed. The working group will consider revising the guidelines with the goal of gaining wider support and endorsement of them. A report on the experiences of those institutions and organizations that implement the guidelines during the use period, together with a summary of other activities of the working group, will be made at a meeting on May 18, 1998.

B. DISTANCE LEARNING

The Distance Learning Working Group met under the leadership of Laura Gasaway, Professor of Law and Director of the Law Library at the University of North Carolina, who represented the Association of American Universities, to discuss the issues involved in distance learning activities and to draft guidelines.

The purpose of the Educational Fair Use Guidelines for Distance Learning is to provide guidance on the application of the performance and display of copyrighted works in some of the distance learning environments that have developed since the enactment of Section 110 and that may not meet the specific conditions of Section 110(2). It is the belief of the working group that these Guidelines basically extend the face-to-face teaching exemptions in Section 110 of the Copyright Act to distance learning but with certain restrictions.

After considerable discussion, the working group had determined that it was feasible to

draft guidelines which only apply to the real time performance and display of a lawfully acquired copyrighted work not covered under Section 110 (2) of the Copyright Act, but that it was not feasible at this time to draft guidelines that apply to asynchronous delivery of distance learning over a computer network.

Although participants in the working group believed that fair use applies in some aspects of such instruction, they did not develop fair use guidelines to cover these situations because, among other things, they felt that the area was still unsettled, that in the face of rapidly developing technology, educational institutions are only now beginning to experiment with such distance learning courses, and publishers and other content creators are in the early stages of developing materials and marketing strategies for publisher-produced computer network delivery of distance learning materials. The working group suggested that the issue of fair use guidelines for asynchronous computer network delivery of distance learning courses be revisited within three to five years.

As with other sets of guidelines, the participation by organizations in the process of drafting these guidelines does not assume the endorsement by any of the participating organizations. On November 25, 1996, it was decided to submit the guidelines to CONFU participants for consideration as a proposal for fair use guidelines for distance learning.[43]

Following extensive national discussion and consideration of the proposal for guidelines by many organizations concerned with distance education issues, it was apparent at the CONFU plenary session meeting on May 19, 1997, that while numerous organizations had endorsed the proposed guidelines, there was a significant number of organizations that opposed endorsement of the guidelines for a variety of reasons. Among the various reasons put forward by individual organizations was the commonly viewed belief that the proposed guidelines did not go far enough in addressing concerns about fair use for asynchronous computer network delivery of distance learning courses.

Given that most participants supported the goal of adopting workable guidelines, yet acknowledging the lack of consensus among CONFU participants on the proposed guidelines, it was agreed that the working group be expanded to include additional representatives from the educational community in order to attempt to resolve some of the concerns and reservations expressed by participants about the proposed guidelines.

This expanded working group would continue to meet periodically to address the concerns raised about the proposed guidelines, and would now additionally pursue the development of fair use guidelines for asynchronous network delivery of distance learning courses. A report on the efforts of the Distance Learning Working Group to draft further guidelines will be made at a meeting on May 18, 1998.

C. EDUCATIONAL MULTIMEDIA

The Consortium of College and University Media Centers (CCUMC), which convened a large group of representatives of both copyright owners and educational institutions which became the Educational Multimedia Working Group, had begun its process of discussing and drafting possible educational multimedia fair use guidelines four months prior to the convening of CONFU. This working group acted under the leadership of the late Ivan Bender, counsel to CCUMC, and Lisa Livingston, Director of Instructional Media, City College/City University of New York, and chair of the CCUMC Government Relations Committee.

The purpose of the Fair Use Guidelines for Educational Multimedia, which were drafted by copyright owners and users after considerable discussion and negotiation, is to clarify the application of fair use of copyrighted works as teaching methods are adapted to new learning environments. The Guidelines apply to the fair use of portions of lawfully acquired copyrighted works in educational multimedia projects which are created by educators or students as part of a systematic learning activity at nonprofit educational institutions. Such institutions are defined as nonprofit organizations whose primary focus is supporting research and instructional activities of educators and students for noncommercial purposes.

On September 6, 1996, CONFU accepted the Educational Multimedia Fair Use Guidelines developed by the organizations participating in the CCUMC working group, and, further, indicated that such guidelines could be included in any resulting CONFU report. On November 25, 1996, it was agreed by CONFU participants, at the urging of a large number of CCUMC working group members who were also participants in CONFU, that the Educational Multimedia Fair Use Guidelines be included in the CONFU Interim Report.[44]

Following extensive national discussion and consideration of the guidelines by numerous organizations concerned with multimedia and education issues, it was apparent at the CONFU meeting on May 19, 1997, that a substantial number of CONFU participants, as well as, other institutions and organizations in both the copyright owner and user communities, supported or had endorsed the guidelines. However, there was not a consensus in support of the guidelines among those organizations participating in CONFU that represent academic and educational institutions and library concerns.

Since many CONFU participants voiced support for the guidelines, and the guidelines were already being implemented in several educational institutions around the country, it was decided that the Educational Multimedia Fair Use Guidelines would be released

in their present and final form. It was suggested that the implementation of the guidelines be observed over the course of the next year, and it was further agreed that a report on the implementation of the guidelines would be made at a meeting on May 18, 1998.

D. ELECTRONIC RESERVE SYSTEMS

The working group met under the leadership of Dr. Kenneth D. Crews, Director of the Copyright Management Center at Indiana University-Purdue University at Indianapolis, who represented the Indiana Partnership for Statewide Education, Laura Gasaway, Professor of Law and Director of the Law Library at the University of North Carolina, who represented the Association of American Universities, Dr. Douglas C. Bennett, Vice President of the American Council of Learned Societies, Carol A. Risher, Vice President of Copyright and New Technology, Association of American Publishers, and Mary E. Jackson, consultant to the Association of Research Libraries. The focus of the working group's attention was to discuss the issues involved in the application of fair use to the creation of electronic reserve systems that allow storage, access, display and downloading of electronic versions of materials that support the instructional requirements of a specific course within a nonprofit educational institution.

After considerable discussion, the working group reached an impasse in late 1995 over the proposed scope and language of possible guidelines. This disagreement among the representatives of the copyright owner, educational institution, and library communities led all parties involved to conclude that it was not possible to draft fair use guidelines capable of gaining wide acceptance at this time. Some members of the working group, however, continued to meet and discuss these issues, which culminated in their drafting and circulating for comment proposed guidelines in March 1996, in the hope of finding a middle ground position which could gain acceptance.

During a CONFU plenary session meeting in May 1996, all parties interested in electronic reserve systems were encouraged to discuss the proposed guidelines in an effort to explore whether widely acceptable guidelines were achievable. Subsequent discussions, however, again revealed significant differences of opinion among the working group's participants about the draft guidelines submitted March 5, 1996.

During the CONFU plenary session on September 6, 1996, there was a general consensus that the proffered Fair Use Guidelines for Electronic Reserve Systems had not received widespread acceptance at that time. While some participants expressed a willingness to endorse or adopt them,[45] other participants expressed their opposition to the proffered guidelines.[46] In discussion of whether the draft guidelines could be characterized as being an understanding of fair use by those organizations that endorsed them, there was a consensus that they were not widely supported at that time within

CONFU. While acknowledging that some institutions may feel free to adopt and implement them, it was decided on November 25, 1996, that the proffered guidelines for electronic reserve systems would not be disseminated as a formal work product of CONFU.

At the CONFU plenary session meeting on May 19, 1997, it was concluded that, while the previously proffered guidelines for electronic reserve systems would not be included in a report on the conclusion of Phase One of CONFU, the issue of developing guidelines for electronic reserve systems could still be part of the discussion within the framework of CONFU should there appear to be substantial support among CONFU participants for reactivating the working group on this issue. The Steering Committee will monitor this issue during the next year and will coordinate with those participants who may wish to renew such discussions within the context of a working group.

E. INTERLIBRARY LOAN AND DOCUMENT DELIVERY

The working group met under the leadership of Mary E. Jackson, consultant to the Association of Research Libraries, and Dr. Douglas C. Bennett, Vice President of the American Council of Learned Societies, to discuss the issues involved both in digital interlibrary loan and document delivery activities and to attempt to draft guidelines. After considerable discussion, the working group unanimously agreed on March 27, 1996, that it was premature to draft guidelines for digital transmission of digital documents.

Subsequent discussions throughout the spring and summer of 1996, failed to achieve agreement on guidelines for digital delivery of print originals under interlibrary loan arrangements. After considerable discussion within the working group and in general plenary sessions, it was agreed by both the copyright owner and user communities that it was not possible, at this time, to draft widely acceptable guidelines for digital delivery of print materials by libraries.

At the CONFU plenary session meeting on May 19, 1997, it was decided that, while there had been agreement that it was not possible at this time to draft guidelines for digital delivery of print materials by libraries, the issue of developing guidelines for the digital delivery of print materials by libraries could still be part of the discussion within the framework of CONFU should there appear to be substantial support among CONFU participants for reactivating the working group on this issue. The Steering Committee will monitor this issue during the next year and will coordinate with those participants who may wish to renew such discussions within the context of a working group.

F. USE OF COMPUTER SOFTWARE IN LIBRARIES

After plenary discussions of the scenarios developed by Sarah K. Wiant, the Director of the Law Library at Washington and Lee University, who represented the Special Libraries Association, and Mark Traphagen, Vice President and Counsel for Intellectual Property and Trade Policy of the Software Publishers Association, it was generally agreed by CONFU participants that, since the scenarios developed by the working group clearly illustrated the general rules and how particular uses of computer program software in libraries either complied with or violated the Copyright Act, there was no need to draft guidelines.

Following several presentations of the statement and scenarios on the use of copyrighted computer programs (software) in libraries, and a thorough discussion and slight revision of the statement, the Statement on Use of Copyrighted Computer Programs (Software) in Libraries -- Scenarios[47] was adopted by CONFU participants on September 6, 1996.

During the plenary session meeting on November 25, 1996, participants agreed by consensus that the Statement amd Scenarios should be appended to the Interim Report. Subsequently, during the CONFU plenary session meeting on May 19, 1997, it was agreed by consensus that the Statement and Scenarios be included in a report on the conclusion of the first phase of CONFU.

G. SUMMARY

In summary, the CONFU process resulted in the development of proposed fair use guidelines for digital images, some aspects of fair use guidelines for distance learning, fair use guidelines for educational multimedia, and the adoption of a statement of scenarios dealing with the use of computer software in libraries. The proposed guidelines proffered by a minority of the working group on electronic reserve systems were not supported widely by CONFU participants. As for the digital transmission of documents in the context of interlibrary loan and document delivery activities by libraries, it was determined by the interested parties involved in the working group that it was premature to draft guidelines addressing this issue.

Copies of all notifications or statements of endorsement or opposition to the three sets of proposals for guidelines, together with all comments from individuals, received by this facilitator, are appended to this report. As additional notifications or comments on the guidelines are received by the facilitator, they will be posted on the U.S. Patent and Trademark Office website.

III. RESULTS

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1. It was agreed by the participants at the CONFU plenary session meeting held on

May 19, 1997, that a Report to the Commissioner on the Conclusion of the First Phase of the Conference on Fair Use will be written by the facilitator, that said Report will include the three sets of guidelines for digital images, distance learning, and educational multimedia and all statements and comments received concerning them, and that said Report would be made available and published in both hard copy and electronic form to all CONFU participants and the public.

2. It was agreed by the participants at the CONFU plenary session meeting held on May 19, 1997, that in connection with the Proposed Educational Fair Use Guidelines for Digital Images, a use period of at least one year will be instituted for their voluntary adoption, implementation, and review by interested institutions. During this use period the Digital Images Working Group will meet periodically to address the various concerns, observations, and criticisms received in connection with the proposed guidelines, and to discuss and negotiate possible refinements of the guidelines with the goal of achieving broad-based support and endorsement of the guidelines. A report by the Working Group on its activities and the results of the use period will be made at a meeting on May 18, 1998.

3. It was agreed by the participants at the CONFU plenary session meeting held on May 19, 1997, that in connection with the Proposed Educational Fair Use Guidelines for Distance Learning, the membership of the current Distance Learning Working Group would be expanded to include academic and educational institutions directly involved in distance learning activities. During the next year, the Distance Learning Working Group will continue to meet periodically to address the various concerns, observations, and criticisms received in connection with the proposed guidelines, to discuss and negotiate the development of guidelines for asynchronous network delivery of distance learning courses, and to discuss and negotiate possible refinements of the proposed guidelines with the goal of achieving broad-based support and endorsement of the guidelines. A report on the working group's activities will be made at a meeting on May 18, 1998.

4. It was agreed by the participants at the CONFU plenary session meeting held on May 19, 1997, that the Steering Committee be expanded to eleven members. Following a discussion on the need to expand the Steering Committee in such a way as to make it more representative of both the copyright owner and user communities, the following individuals were elected by consensus to serve on the expanded Steering Committee: Christine Dalziel, American Association of Community Colleges and the Instructional Communications Council; Adam M. Eisgrau, American Library Association; Mary B. Levering, U.S. Copyright Office, Library of Congress; Lisa Livingston, Consortium of College and University Media Centers; Victor S. Perlman, American Society of Media Photographers; Carol Risher, Association of American Publishers; Judith M. Saffer, Broadcast Music, Inc.; Mark Traphagen, Software Publishers Association; Laila van

Eyck, National Association of State Universities and Land-Grant Colleges; John C. Vaughn, Association of American Universities; and Patricia Williams, American Association of Museums.

5. It was agreed by the participants at the CONFU plenary session meeting held on May 19, 1997, that CONFU remains committed to fostering a dialogue on all fair use issues, including browsing, electronic reserves, interlibrary loan and document delivery, even though proposals concerning these issues have not been developed fully to date nor been widely accepted by participants.

6. It was agreed by the participants at the CONFU plenary session meeting held on May 19, 1997, that a meeting would be convened on May 18, 1998, to receive reports from the continuing working groups on their activities, to receive a report from the Digital Images Working Group on the voluntary use period initiated in connection with the proposed fair use guidelines for digital images, to review the experiences of institutions that have implemented the fair use guidelines for educational multimedia, and to assess the progress, if any, in drafting more comprehensive fair use guidelines for distance learning, as well as toward achieving greater acceptance in the copyright owner and user communities for the three sets of fair use guidelines.

IV. CONCLUSION

CONFU is an extraordinary public-private effort, requiring many days of meetings and travel since its inception in September 1994. Many organizations, from both the public and private sector, and especially a large number of nonprofit organizations, have devoted substantial human and financial resources and have made significant sacrifices to participate in the CONFU effort to develop fair use guidelines for educational and library uses of copyrighted works in a digital environment. The total investment of time, resources, and sustained participation by those involved cannot be measured fully.

Some organizations approached CONFU initially in the belief that there was little chance of reaching agreement on guidelines. Others expressed their misgivings and skepticism as to whether such a negotiating process could yield substantial and meaningful results. Yet, most participants feel that it is both a beneficial forum for discussion and an instructive and productive endeavor for those interested in fair use issues, even when the good faith efforts and best intentions of the participants have not always resulted in a meeting of minds.

Now that CONFU has concluded its first phase of activity, and has placed three sets of guidelines in the world for public debate, discussion, endorsement, and implementation, as institutions and organizations see fit, it now necessarily moves into a new phase of existence. Much the way an engineer, after spending time and energy to build a model

of his or her invention, must now use it to see if it works, making refinements or changes where necessary to improve its functioning, so, too, does CONFU now need to encourage the implementation and use -- the experimentation, if you will -- of the guidelines to see how they work in the classrooms, libraries, and media centers where they are needed, and, ultimately, where their value as workable guidelines will be assessed.

It is true that not all CONFU participants support the three sets of guidelines. Indeed, some CONFU participants strongly oppose them, while others strongly support them. It can fairly be said that the CONFU process of developing fair use guidelines has amply proven the truth of the old adage that reasonable minds can disagree. That is why this Report, therefore, contains all statements and comments received in connection with the three sets of guidelines, so that such information and opinions may be included in one's own assessment of the value of the guidelines.

As CONFU moves into its next phase, there may not be agreement among all participants as to the value and viability of the guidelines so far produced, but there does appear to be wide-spread support among participants for continuing a dialogue on fair use issues with an ultimate goal of developing broad-based agreement, at the very least, on principles and practices, if not guidelines, in the copyright owner and user communities. Should this happen, this accomplishment alone will have proven the worth of CONFU as a valuable and important contribution to the appreciation of fair use in the rapidly expanding digital environment in which we live.

FOOTNOTES

1*See* Exec. Order No. 12864, 3 C.F.R. 634 (1993).

2Information Infrastructure Task Force, National Telecommunications and Information Administration, *National Information Infrastructure: Agenda for Action* (1993).

3Information Infrastructure Task Force, *Global Information Infrastructure: Agenda for Cooperation* (1995).

4For a ist of participating agencies, *see* Information Infrastructure Task Force, Working Group on Intellectual Property Rights, *Intellectual Property and the National Information Infrastructure: The Report of the Working Group on Intellectual Property Rights* (1995) [hereinafter "WHITE PAPER"] at App. 3.

5*See* Request for Comments on Intellectual Property Issues Involved in the National Information Infrastructure Initiative, 58 Fed. Reg. 53,917 (1993).

6*See* Information Infrastructure Task Force, Working Group on Intellectual Property Rights, *Intellectual Property and the National Information Infrastructure: A Preliminary Draft of the Report of the Working Group on Intellectual Property Rights* (1994) [hereinafter "GREEN PAPER"].

7*See* Notice of Hearings and Request for Comments on Preliminary Draft of the Report of the Working Group on Intellectual Property Rights, 59 Fed. Reg. 42,819 (1994); Extension of Deadline for Comments on Preliminary Draft of the Report of the Working Group on Intellectual Property Rights, 59 Fed. Reg. 50,222 (1994).

8*See* GREEN PAPER, *supra* note 6, at 133.

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9*Id.* at 134.

10*See* Notice of First Meeting of Conference on "Fair Use" and the National Information Infrastructure (NII), 59 Fed. Reg. 46,823 (1994).

11*See* WHITE PAPER, *supra* note 4, at 83.

12*See* CONFERENCE ON FAIR USE PARTICIPANTS *infra* Appendix A.

13This was accomplished by having an attorney-advisor in the Office of Legislative and International Affairs of the Patent and Trademark Office act as an executive secretary for the Conference on Fair Use. From September 1994 to July 1995, Christopher A. Meyer served in this capacity; from September 1995 to the present, Peter N. Fowler has served in that capacity and authored both this Report and the CONFU Interim Report in December 1996 .

14The initial Steering Committee members were: Stan Cahill, Public Broadcasting System; Carol C. Henderson, American Library Association; Mary B. Levering, U.S. Copyright Office, Library of Congress; Carol A. Risher, Association of American Publishers; and Mark Traphagen, Software Publishers Association. In late 1995, Carol Henderson designated Adam M. Eisgrau as her replacement, and Stan Cahill ceased being an active participant on the Steering Committee.

15*See* WHITE PAPER, *supra* note 4, at 7.

16The Copyright Act of 1976, as amended, is codified at 17 U.S.C. ' 101 *et seq.* (1994). Hereinafter, the Act is cited as "17 U.S.C. ' ___" or "17 U.S.C.A. ' ___ (WEST SUPP. 1996)."

17*See* H.R. REP. NO. 1476, 94th Cong., 2d Sess. 47 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659 [hereinafter HOUSE REPORT].

18*See* 17 U.S.C.A. ' 107 (WEST SUPP. 1996); *see also,* 3 NIMMER ON COPYRIGHT ' 13 (1993). There are a number of websites devoted to copyright and fair use issues, see, e.g., Stanford University Copyright and Fair Use Site (http://www.fairuse.stanford.edu) or University of Virginia Law Library Copyright and Fair Use Site (http://www.gopher.lib.virginia.edu).

1917 U.S.C. ' 107 (1994).

20*See* WHITE PAPER, *supra* note 4, at 16.

21*See* WHITE PAPER, *supra* note 4, at 80.

2217 U.S.C.A. ' 107 (WEST SUPP. 1996).

2317 U.S.C. ' 108 (WEST SUPP. 1996).

2417 U.S.C. ' 110 (WEST SUPP. 1996).

25*See Agreement on Guidelines for Classroom Copying in Not-for-Profit Educational Institutions* [hereinafter "CLASSROOM GUIDELINES"], contained in HOUSE REPORT, *supra* note 17, at 68-74, *reprinted in* 1976 U.S.C.C.A.N. 5681-88.

26*See Guidelines for Educational Use of Music*, contained in HOUSE REPORT, *supra* note 17, at 70-71, *reprinted in* 1976 U.S.C.C.A.N. 5684-85.

27*See CONTU Guidelines on Photocopying Under Interlibrary Loan Arrangements*, contained in REPORT OF THE CONFERENCE COMMITTEE ON THE NEW COPYRIGHT LAW (H.R. No. 1733, 94th Cong., 2d Sess., at 71-73) *reprinted* in 1976 U.S.C.C.A.N. 5812-14.

28*See Guidelines for Off-Air Recording of Broadcast Programming for Educational Purposes*, contained in HOUSE REPORT ON PIRACY AND COUNTERFEITING AMENDMENTS (H.R. No. 495, 97th Cong., 1st Sess. at 8-9), *reprinted* in U.S. COPYRIGHT OFFICE, *Reproduction of Copyrighted Works by Educators and Librarians (Circular 21)* (1992) p. 26.

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29*See* GREEN PAPER, *supra* note 7, at 134.

30*See* WRITTEN STATEMENTS SUBMITTED TO CONFU *infra* Appendix B.

31*See* SUMMARY OF INITIAL PROPOSED PRINCIPLES *infra* Appendix C.

32*See* CLASSROOM GUIDELINES contained in HOUSE REPORT, *supra* note 17, at 68-74, *reprinted in* 1976 U.S.C.C.A.N. 5681-88.

33*See* note 27 *supra* and accompanying text.

34*See* TOPIC AND ISSUE PAPER PRESENTERS *infra* Appendix D.

35*See* TOPIC GRID *infra* Appendix E.

36The Working Groups were: DIGITAL IMAGES, DISTANCE LEARNING, EDUCATIONAL MULTIMEDIA, ELECTRONIC RESERVE SYSTEMS, INTERLIBRARY LOAN/DOCUMENT DELIVERY, and SOFTWARE USE IN LIBRARIES.

37*See* PARTICIPANTS IN THE MEETING ON THE FAIR USE OF MUSIC MATERIALS IN A DIGITAL ENVIRONMENT, *infra* Appendix F.

38Inasmuch as no copyright legislation was under active consideration at that time by Congress, the CCUMC Working Group on Educational Multimedia sought the endorsement of the guidelines by the Subcommittee on Courts and Intellectual Property, Committee on the Judiciary, U.S. House of Representatives, which adopted a Nonlegislative Report Relating to the Fair Use Guidelines for Educational Multimedia (September 27, 1996).

39*See* UNIFORM PREAMBLE FOR FAIR USE GUIDELINES *infra* Appendix G.

40The official U.S. Patent and Trademark Office website is available at: http://www.uspto.gov.

41*See* NOTIFICATIONS RECEIVED FROM ORGANIZATIONS AND INSTITUTIONS CONCERNING THE PROPOSALS FOR FAIR USE GUIDELINES *infra* VOLUME TWO.

42*See* PROPOSED EDUCATIONAL FAIR USE GUIDELINES FOR DIGITAL IMAGES *infra* Appendix H.

43*See* PROPOSED EDUCATIONAL FAIR USE GUIDELINES FOR DISTANCE LEARNING *infra* Appendix I.

44*See* FAIR USE GUIDELINES FOR EDUCATIONAL MULTIMEDIA *infra* Appendix J.

45The following organizations are on record as endorsing or supporting the proffered Fair Use Guidelines for Electronic Reserve Systems: American Association of Law Libraries, American Council of Learned Societies, Association of American University Presses, Inc., Indiana Partnership for Statewide Education, Music Library Association, National Education Association, National School Boards Association, and Special Libraries Association.

46The following organizations are on record as opposed to the proffered Fair Use Guidelines for Electronic Reserve Systems: American Society of Composers, Authors and Publishers, American Society of Journalists and Authors, American Society of Media Photographers, Association of American Publishers, Association of Research Libraries, Authors Guild/Authors Registry, Recording Industry Association of America, and Software Publishers Association.

47*See* STATEMENT ON USE OF COPYRIGHTED COMPUTER PROGRAMS (SOFTWARE) IN LIBRARIES --SCENARIOS *infra* Appendix K.

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